Brickwork

ENGLISH PRECEDENT FOR MODERN BRICKWORK

693.21
A512e

TUR [illegible]

Ex Libris
Turpin C. Bannister

UNIVERSITY
OF FLORIDA
LIBRARIES

1853

Architecture and Fine Arts
Library

Digitized by the Internet Archive
in 2011 with funding from
LYRASIS Members and Sloan Foundation

http://www.archive.org/details/englishprecedent00amer

ENGLISH PRECEDENT
FOR
MODERN BRICKWORK

ACKNOWLEDGEMENT

In the preparation of this book we have been aided by Mr. R. Randal Philips, of COUNTRY LIFE, London, who assisted in selecting photographs and in securing data for the text on English brickwork; also to Mr. Elmer Bennett and Mr. Gordon Robb, architects of New York and Boston, respectively, who prepared the detail drawings from measurements, and in the instances of buildings not existing, from data in publications of B. T. Batsford, London; and, finally, to the several American architects who kindly furnished photographs and drawings for the section on American brickwork.

ENGLISH PRECEDENT
FOR
MODERN BRICKWORK

Plates and Measured Drawings of
English Tudor and Georgian
Brickwork, with a few recent
versions by American
Architects in the spirit
of the old work.

Price Two Dollars

Edited and Published by
THE ARCHITECTURAL FORUM, NEW YORK
FOR
THE AMERICAN FACE BRICK ASSOCIATION
CHICAGO

Copyright, 1924, by B. W. Ballou, President
The American Face Brick Association
Chicago, Ill.

University of Florida
1853

Introduction

THE establishment of a material on its proper basis as a factor of good building is recognized by every keen observer of architectural development as one of the most far-reaching of the results brought about in the last few decades by architectural training and intelligent study of the past great eras of building.

As a means of architectural expression, every building material seems to have experienced a period of treatment which at one time or another not only forced an abandonment of sound basic usage but even imposed a stigma of unworthiness which prejudice was slow to remove. Brick as a medium of architectural expression has a worthy tradition, yet during the nineteenth century architects and builders, in their mistaken zeal for mechanical perfection brought its use into discredit. Happily the Gothic revival helped to restore brick treatment to sound traditional lines, and it has since steadily developed in architectural quality. Brickwork detail is a refinement which appeals particularly to the cultured eye of the architect. It has a wealth of possibilities and, held within reasonable bounds, can be effected at comparatively small cost. The numerous examples of northern Italy show possibilities of beautiful treatment; the Netherlands are full of suggestion, and the work of Tudor and Georgian England has much of value for modern inspiration.

It is to point out the beauty and adaptability of Tudor and Georgian precedent that the illustrations and text of this book have been gathered and compiled. It has been the endeavor throughout to picture the *spirit* of this old work, because it was the product of enthusiastic design and the best brick craftmanship, both of which are essential to architecture.

Brick design permits, first, a wide choice in variation of surface tone from a wall of diversified color effect to one of quiet monotone of any shade, simulating dressed stone; there is also the opportunity for pattern, such as the diaper, exemplified in old Tudor buildings; then there are cornices and string courses, copings and any number of other treatments that can be carried out in standard sized brick with some special ingenuity expended in design and care in supervision of the construction. Today, the brick manufacturer places at the architect's disposal a range of colors and textures that he can employ as freely as the artist uses the colors on his palette, and with the co-operation of skilled brick masons the effects that can be produced are limitless.

CONTENTS

PAGE

INTRODUCTION 7

AN APPRECIATION OF ENGLISH BRICKWORK 11

CHRONOLOGY OF ENGLISH BRICKWORK 15

TUDOR BRICKWORK 17

GEORGIAN BRICKWORK 41

AMERICAN BRICKWORK 63

ENGLISH RUBBED, CUT, MOULDED BRICK AND THEIR AMERICAN COUNTERPARTS 87

BONDS AND MORTAR IN ENGLISH BRICKWORK 91

PRODUCTION OF FACE BRICK 95

OFFICERS, DIRECTORS AND MEMBERS OF AMERICAN FACE BRICK ASSOCIATION 98

LIST OF PLATE ILLUSTRATIONS

TUDOR BRICKWORK

Page

Ingatestone Parish Church, Essex 18

Detail of South Elevation, Sutton Place, Guilford, Surrey 20–21

Entrance Detail, Compton Wynyates, Warwickshire 22–23

Bay Window of Great Hall, Compton Wynyates, Warwickshire 24–25

A Portion of the Tudor Work, Hampton Court Palace, Middlesex 26

Another Fragment of the Tudor Work, Hampton Court Palace, Middlesex 27

Entrance Court, Hampton Court Palace, Middlesex 28

Bay Window to Wolsey's Rooms, Hampton Court Palace, Middlesex 29

Chimney Stack at Newport, Essex 30

Chimney, Goddard's Green, near Cranbrook, Kent 31

Almshouses at Quainton Road, Oxfordshire 32

Brick Tower at Horham Hall, Suffolk 33

Almshouse at Audley End., Essex 34–35

The Outer and Inner Gatehouses to Little Leigh's Priory 36–37

The Grammar School, Rye, Sussex 38–39

LIST OF PLATE ILLUSTRATIONS *(Continued)*

GEORGIAN BRICKWORK

Page
Detail House at Treyford, Sussex 40
Detail of Wing, Groombridge Place, Kent 42–43
Entrance Door, Choir House at Salisbury, Wilts 44–45
Stables at Denham Place, Middlesex 46
Deaf and Dumb Asylum, Clapton, London 47
The Guildhall, Rochester 48
Window Detail, The Guildhall, Rochester 49
Detail of Queen Anne's Orangery, Kensington Palace, London 50–51
Detail Christ's Hospital, Newgate St., London 52
Elevation of the Bluecoat School, Westminster 53
Great Hall, Winchester School, Winchester, Hants 54–55
A House in the Cathedral Close, Salisbury, Wilts 56
The Lucas Asylum, Wokingham, Berks 57
Garden Wall Pier, Ham House, Surrey 58–59
Garden House, Charlton House, Wilts 60–61

AMERICAN BRICKWORK

Page
Detail of Entrance, Front of the Burden House, Long Island 62
Entrance Detail of the Burden House, Long Island 66–67
Entrance to the Mrs. W. K. Vanderbilt House, New York City 68–69
Garden Front of the Potter House, Long Island 70–71
Garden Facade of the Deford House, Maryland 72–73
Standish Hall, Harvard University 74–75
The Links Club, New York City 76–77
Detail of Perkins Institute for the Blind, Massachusetts 78–79
Missions Library, Yale University 80–81
Entrance Front of the Seavern House, Hartford, Conn. 82–83
Detail of the Hendrix House, Larchmont, New York 84
Entrance Front of the Sherman House, Long Island 85
Great Baddow Church, near Chelmsford, Essex 86

COVER DESIGN AND FRONTISPIECE

Cut Brick Door Trim, Longbridge House, Farnham, Surrey—Color Vignette. From a Water Color Drawing by Louis C. Rosenberg . . . . *Cover*
An English Manor House and Garden, from a Water Color Drawing by O. R. Eggers—*Frontispiece*

AN ENGLISH MANOR HOUSE AND GARDEN
FROM WATER COLOR BY O. R. EGGERS

An Appreciation of English Brickwork

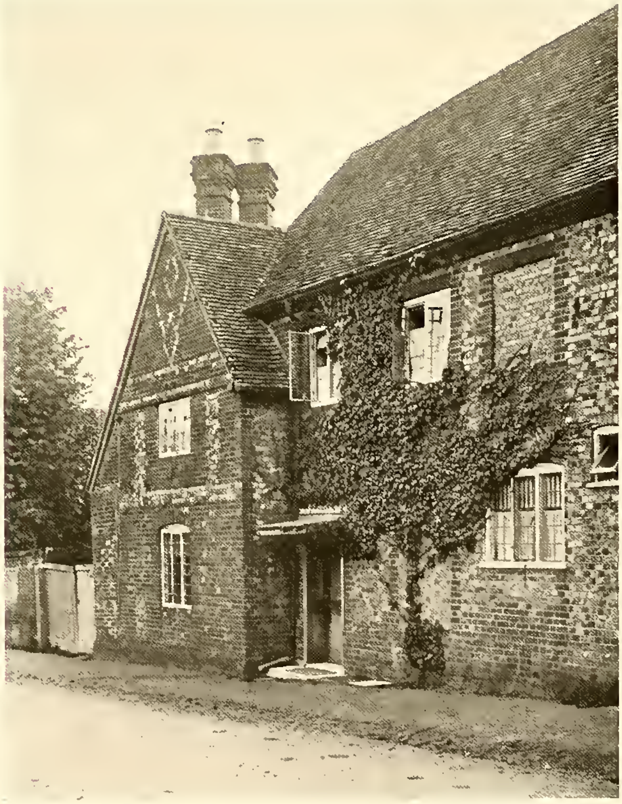
IN attempting an appreciation of English brickwork, one calls immediately to mind pictures of domestic rather than of civic scenes: a winding village street perhaps, lined with charming little houses of differing character and various dates, many of them built wholly of brick, others of brickwork combined with half timber, and others of plastered brick. Or the picture is on a rather more important scale, a manor house that has withstood centuries of exposure, an unpretentious, pleasant house, displaying fancies in brickwork here and there, maybe in a string course, maybe in the treatment of the porch, maybe in the cornice. And enlarging further our view we get the picture of a country "seat", of that charming and essentially English kind which was wrought in the days when every craftsman was an artist—unconsciously an artist, and therefore the better artist. Compton Wynyates is a perfect example of this. It is all of brick, simple in character, with a whimsical play in the twisted stacks and other features that enliven the house. But its art is not to be captured by foot-rule and measuring tape. It is far too subtle for that. We of the present day, being sophisticated, cannot take the work of these craftsmen and repeat it without the thing's becoming either a pure affectation or a shell without life.

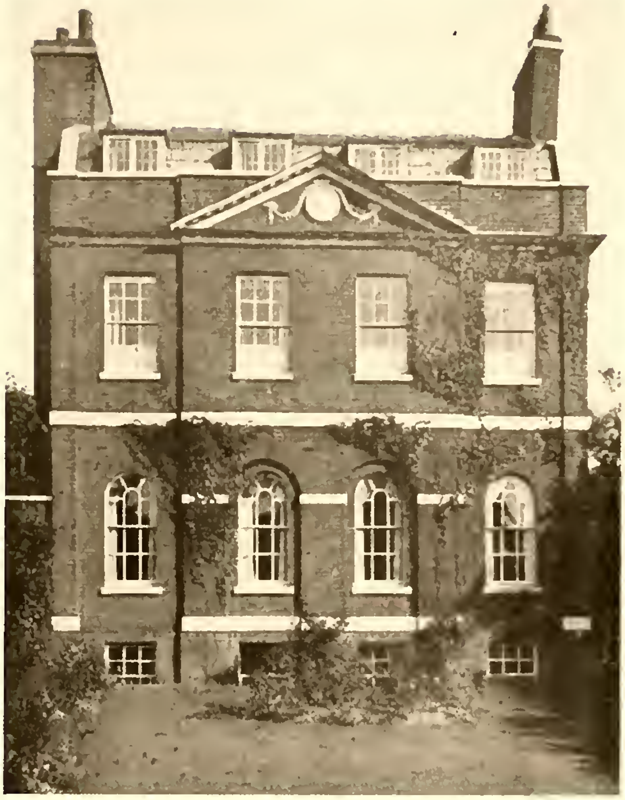
It was produced without the aid of architects in the modern meaning of the word, and is the product of native genius and ability. Local craft traditions, affected here and there by the craftsman's contact with the ideas and the manners of foreign workmen were the guiding spirit behind the work. Every worker's participation in the joy of creation is evident in the buildings that remain.

Much has been said and written about the influence of craftsmanship on design, and certainly in the case of brick architecture craftsmanship had a dominating influence, not perhaps so much in the later work of the Renaissance, as in the earlier Tudor work. The world is made up of all sorts, and both Tudor and Renaissance buildings have their distinctive qualities which call forth our admiration. But there is no gainsaying the fact that the peculiarly individual character of the former belongs to the original builders alone, and though we shall do well in trying to emulate their qualities, and shall do especially well in trying to obtain that modulated texture which constitutes no little of the charm of Tudor brickwork, it is fatuous to set out to build the old anew. Most of those who have attempted to do this have simply given us modern "Tudor" which is as hard as steel, with no atom of feeling in its composition.

Because Tudor building was craftwork we can turn with greater advantage to later Renaissance days, especially to the second half of the eighteenth century, for, though the standard of craftsmanship in England was then much higher than it is today, the buildings were fashioned by architects and not by craftsmen, and therein lies a great measure of difference. In the earlier work very little regard was paid to the niceties of balance and finish which account for so much in the later work. If you examine, for instance, a piece of Tudor brickwork you find all manner of variations. The face of the wall is not flat in the mechanical sense which we know; the bricks are not of uniform size, and of course there is none of that uniformity of color and surface which characterised the early machine made bricks. A brick was not thrown out because it was a little darker or a little longer than its fellows. If it was a good brick it was used and this use of bricks as they came to hand suggested those pleasant diapers which so effectively relieve a large expanse of wall surface. Modern training would lead us, when building such a wall, to see that the diaper was accurately set out, its diagonals regular ; but these things did not trouble the old builders, and the very fact that they did not lay out their work as we do on a drawing board gives it a quality which is as delightful as it is individual.

While ready, however, to appreciate all the distinctive charm of a Tudor building, we can delight no less in Georgian brickwork. But before we speak of Georgian, we must recall the work from which it proceeded. Wren was a great builder in brick, chiefly because so much of his work had to be done as econom-


Brick Cottage at Aldermaston, Berkshire, showing Tudor influence in patterning and chimneys. Probably built about 1700.



A fine example of Georgian work is found in the Brown House at Reigate

ically as possible, and brick was cheap. But when opportunity came for display he could use brick with amazing effect. Look, for instance, at that glowing south front of Hampton Court, framed in by its "good Portland stone." There are, too, those many features of brickwork embellishment which were made possible by the use of "rubbers," and by similar soft and close-grained brick that could be carved, even finely carved.

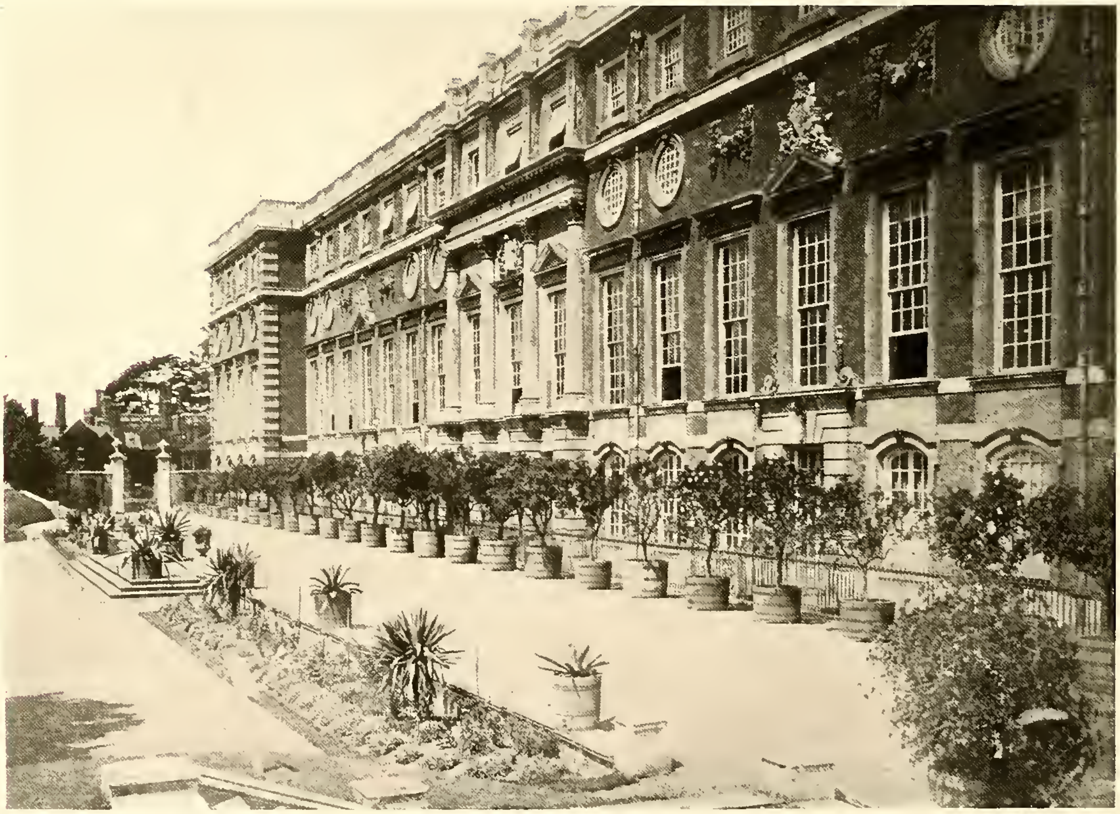
Under the direction of Wren and his immediate followers the blackened ruins of London gave way to plum-colored brick facades, enriched as taste decreed and purse allowed, with string courses to mark floor levels and special moulded sections for cornices based on classic models. It was then that craftsmen eagerly sought the mysteries of gauged work from Holland, and that the rubbed brick enrichments of King's Bench Walk and the pilasters of Christ's Hospital were built to the lasting glory of burned clay. With so much building the bricklayer became a man of consequence, and as history records, even an aspirant to the status of architect. From the days of the great fire to the hour of Queen Anne's death English brickwork had a prestige to which homage was paid by the colonists in the distant lands of Virginia and Pennsylvania.

During the eighteenth century brick was the favorite material in those parts of England where it was easily obtainable; that is to say, roughly, the southern half of England; and no matter where we go we still see today those Georgian houses, orderly, showing a sedate face; and the impression they leave with us is that there is no better model for inspiration for the houses of our own day.

This Georgian brick architecture depended for its aesthetic effect less upon design, though that was never absent, than upon excellence in handling the material. Fortunately the interest in craftsmanship that grew out of the Gothic revival led us back to fundamental principles, and today not the least interesting work being done is based on careful study and adaptation of this older English brickwork.

In the Tudor country house at Newport, page 65, which John Russell Pope built for Mr. Stuart Duncan, patterned brick and many of the interesting architectural details of Compton Wynyates have been successfully incorporated. In the rubbed-brick mouldings of the entrance to Mrs. Vanderbilt's house, New York City, page 68, Mott B. Schmidt has succeeded in reproducing the delicate charm of one of the Georgian doorways in King's Bench Walk, London. The house built for Alonzo Potter, at Syossett, L. I., by Peabody, Wilson and Brown, page 70, recalls in the treatment of the wings the proportion and dignity which Wren so successfully created in Groombridge Place, Kent, pages 42 and 43.

These few examples of the influence of English precedent upon modern American brickwork obviously reveal the possibilities for the traditional use of brick in architectural design of today.



The South Front of Hampton Court Palace shows Wren's skillful combination of stone trim and rich details to relieve the monotony of the plain walls

Chronology of English Brickwork

B. C. 55 — A. D. 420. Period of Roman brickwork. The remains of Roman brick building in England are in no way different from those in other parts of the Empire. There are examples at most of the southern Chesters of the two methods of employing brick construction: *structura caementicia*, a mass of rubble concrete faced in stone, with bonding courses of two or three flat tile bricks, and *opus testaceum*, in which the facing and arch work of the structure is brick.

A. D. 420 — 1066. Saxon era. Deterioration of use of brick as practiced by the Romans. A complete cessation of scientific construction followed the sudden withdrawal of the legions.

1066. Beginning of Norman period. Introduction from France of excellent masonry — chiefly in stone; but sometimes developed in brick as at Colchester. Here, as elsewhere, during this period, much use was made by the Norman builders of brick remaining from the time of the Roman occupation. The chief cause of the re-use of brick was the growing scarcity not only of stone but of timber.

1260. Little Wenham Hall, Suffolk. Considered the earliest remaining example of this revival of the use of brick. Here bricks averaging 9¾ x 4¾ x 2¼ inches, now dull in color, were mixed with courses of stone and flint in walling.

1290. St. Nicholas' Chapel, Coggeshall. Earliest attempt at brick architecture proper. Jambs, mullions and lancet arches of windows are all of brick; without, splayed jambs are finished with moulded brick at corners.

1400 — 1500. Considerable development of use of brick for church building, particularly in Essex. Beginning of Tudor period.

Although the use of brick in church building was fragmentary and incidental, in house work its possibilities were grasped and a style developed which is the most typical of English domestic styles. In cottages and smaller houses brick was early discovered to be a suitable filling for half-timber framing. A fine example is West Stow Hall, Suffolk, where every pattern of brick bonding seems to have been exploited.

Another characteristic of Tudor brickwork is the introduction of diaper patterns, originating in the accidental effects obtained by the use of vitrified headers. In Tudor times the door and window openings were formed of stone except when the bolder brick builder, by making his arches, mullions, and transoms of brick, gave to his work the integrity of being built entirely of one material. Square-headed windows, though not uncommon, seem to have been a difficulty prior to the use of flat-headed arches with radiating *voussoirs*, a trick to become in Georgian times the motif of a style.

Corbeling is a marked feature of Tudor brickwork. It retained a strong Gothic tradition until well into the sixteenth century, as at Layer Marney, in Essex; it was at its finest in such early work as Rye House, Hertfordshire. The chimneys are also a striking feature. They were a comparative innovation to the early Tudor architect. To quite a late date smoke had blackened the rafters of the great Gothic halls, but when the convenience of chimneys came to be generally appreciated and the Tudor builders had given careful thought to their treatment, the most beautiful chimney stacks were produced. Innumerable patterns of cut and moulded brickwork were adopted; such in particular as those at Hampton Court. With the death of Henry VIII the elaboration of chimneys ceased; those of Elizabeth's time have straight stacks, and an oversailing cap of thin bricks.

1425. Tattershall Castle, Lincolnshire, according to George Edmund Street "the earliest example of the free use of moulded brick in a noble architectural work."

1440. Eton College begun in the reign of Henry VI. Fine diaper work and excellent chimneys. Building of Rye House, Hertfordshire, famed for its oriels, chimneys and corbelings.

1480. Bishop's Palace, Hatfield; especially fine diapers.

1500. Almost at the beginning of the century a new movement in architecture came into being, and the new Renaissance note was struck in all important buildings. Use of terra cotta beginning.

1500 — 1525. Layer Marney Tower, Essex. The most famous brick house in England for Tudor brick corbeling and diapers. Parapet and center windows are of terra cotta and Renaissance in detail.

1500 — 1515. Wolterton Manor, East Barsham. "The most perfect brick house in England" in point of style; pure Tudor Gothic; chimneys, turrets, parapets and strings elaborate with brick heraldry.

1515 — 1520. Hampton Court, built by Cardinal Wolsey.

1523 — 1525. Sutton Place, Guildford, Surrey; Nonesuch Palace Surrey; Little Leighs Priory, Chelmsford, Essex.

Geographically, the use of brick during this period was more widespread than during the earlier Tudor era, the center of interest passing from the eastern to the southern and south-midland counties. The most characteristic feature of this Renaissance brickwork was the flat rubbed brick arch. The wider openings, as gateways, were spanned with elliptical arches. In brick, as in stone, the orders formed the great decorative resource of Renaissance architects. Heavy classic cornices were built up of 2½-inch bricks, often with dentils and modillions, tiles being used in the early work for the smaller fillets. Effective strings were formed of three or four courses of brick, slightly projected.

1604. Kew Palace. An early illustration of the Dutch influence. The windows have projecting architraves of 2-inch rubbers, with every third course sunk as a rustication.

There is also a suggestion of Flemish influence in Pendell House, Bletchingly, which has been attributed to Inigo Jones. It has curiously shaped arches over the ground floor windows, and most interesting chimneys.

Jacobean brick mansions are by no means rare, but the brick revival, destined to continue until the beginning of the nineteenth century, did not become general until the latter half of the seventeenth.

1630. Brickwork begun by Inigo Jones, who like his master Palladio, was by no means averse to brick, though using it little in his more important works. West Woodhay manor house, an apparently authentic design by Inigo Jones, shows an early use of rubbed brick in its window architraves. In Raynham Hall, Norfolk, and Chilham Castle he employed brick for facing only, while Stoke Park shows it used in rather a Palladian manner for pilasters. St. Paul's Church, Covent Garden, London, was probably the first use of brick in Renaissance church building in England. The fine brick house at Tyttenhanger, Hertfordshire, has been attributed to Inigo Jones, but its date and character appear to be somewhat later.

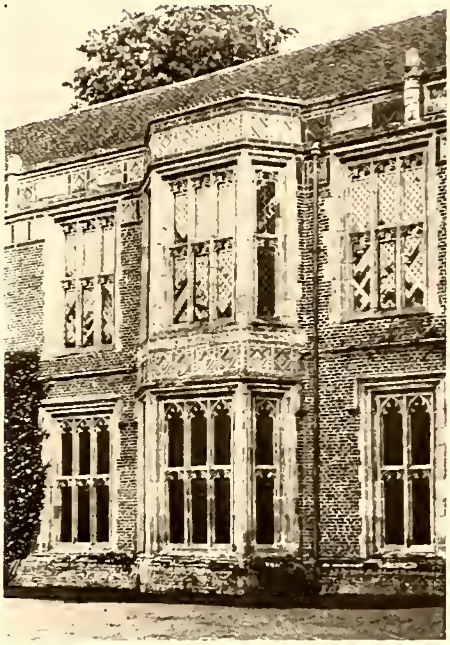
Wren's brickwork attracting attention in his wide use of brick for residences both large and small. Introduction of the use of yellow stocks, cut and rubbed brick. Ionic pilasters and capitals at Christ's Hospital, London. Fine effect of red and yellow brickwork. Protected portions of walls, such as the heads of niches, were beautifully formed of brick.

1688. Bluecoat School, Westminster, perhaps the most careful and consistent of all Wren's brick buildings; pilasters, capitals and cornices of cut brick. Color used broadly at Hampton Court, where in the new buildings brick of an ordinary dull red in the lower story contrasted with the bright red of rubbed and cut brick above.

Eighteenth Century. Most brilliant period of brickwork passed, followed by a decline which was characterized by much indifferent and perfunctory work.

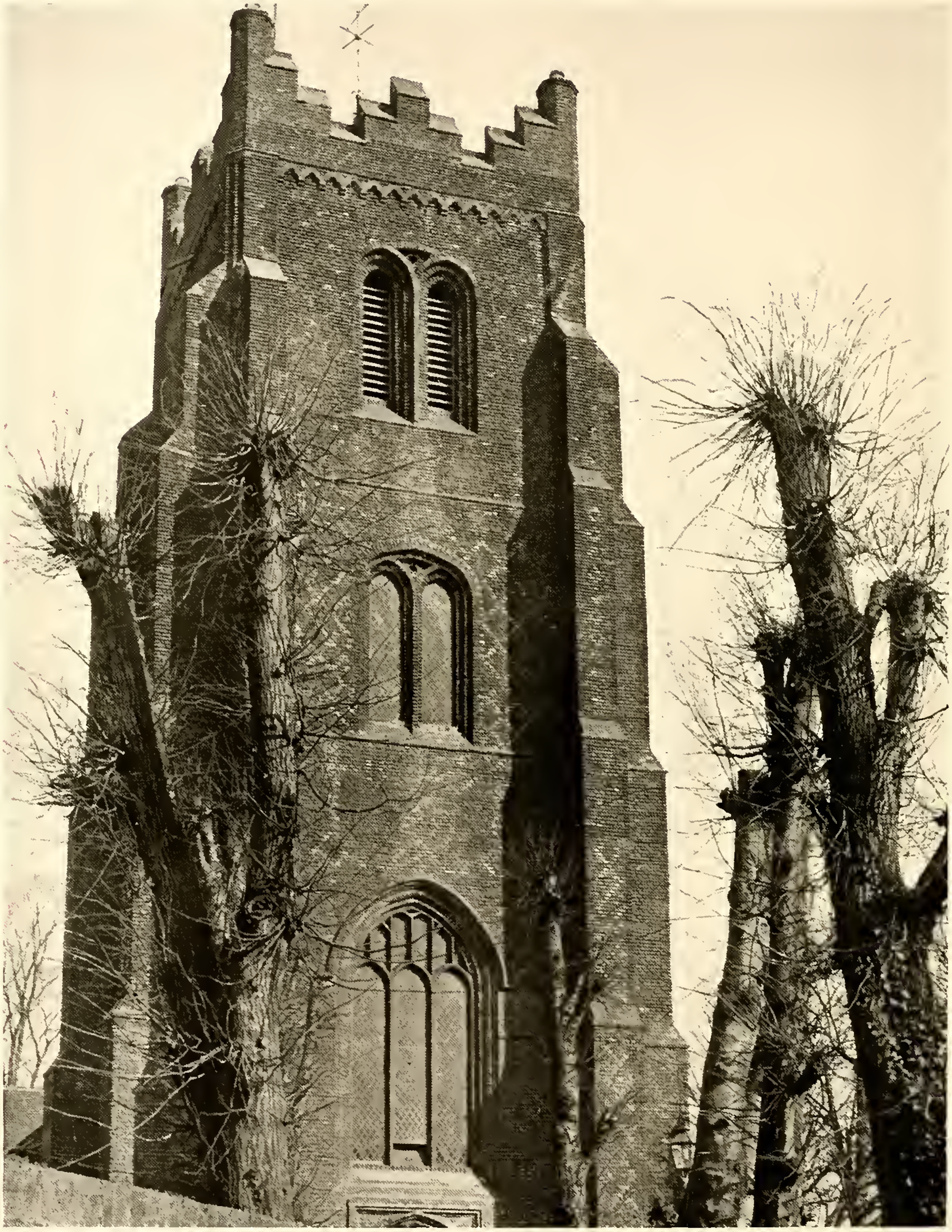
Nineteenth Century. The rivivals of the nineteenth century induced a renewed vigor of brick practice. Impelled by economic considerations to build of brick, the great Gothic revivalists widely employed that material with architectural enthusiasm.

TUDOR BRICKWORK



DETAIL OF SUTTON PLACE
A WONDERFUL COLOR HARMONY IN BRICK
AND TERRA COTTA

IT is usual to say that the Romans introduced brick building into Britain. So they did, but the "brick" they used was not, properly speaking, a brick; it was a very large tile. Brickwork, as it is known today, originated with the Low Countries whence it was brought by the refugees to England in mediaeval times after Roman methods had long been forgotten. Tudor times saw the perfection of a brick architecture which in beauty of form, color and texture has never been surpassed. Many examples of this unsymmetrical, romantic architecture of the craftsman, impossible of exact duplication, stand to this very day after centuries of exposure, a mellowed heritage.



INGATESTONE PARISH CHURCH, ESSEX
OF 15TH CENTURY DATE

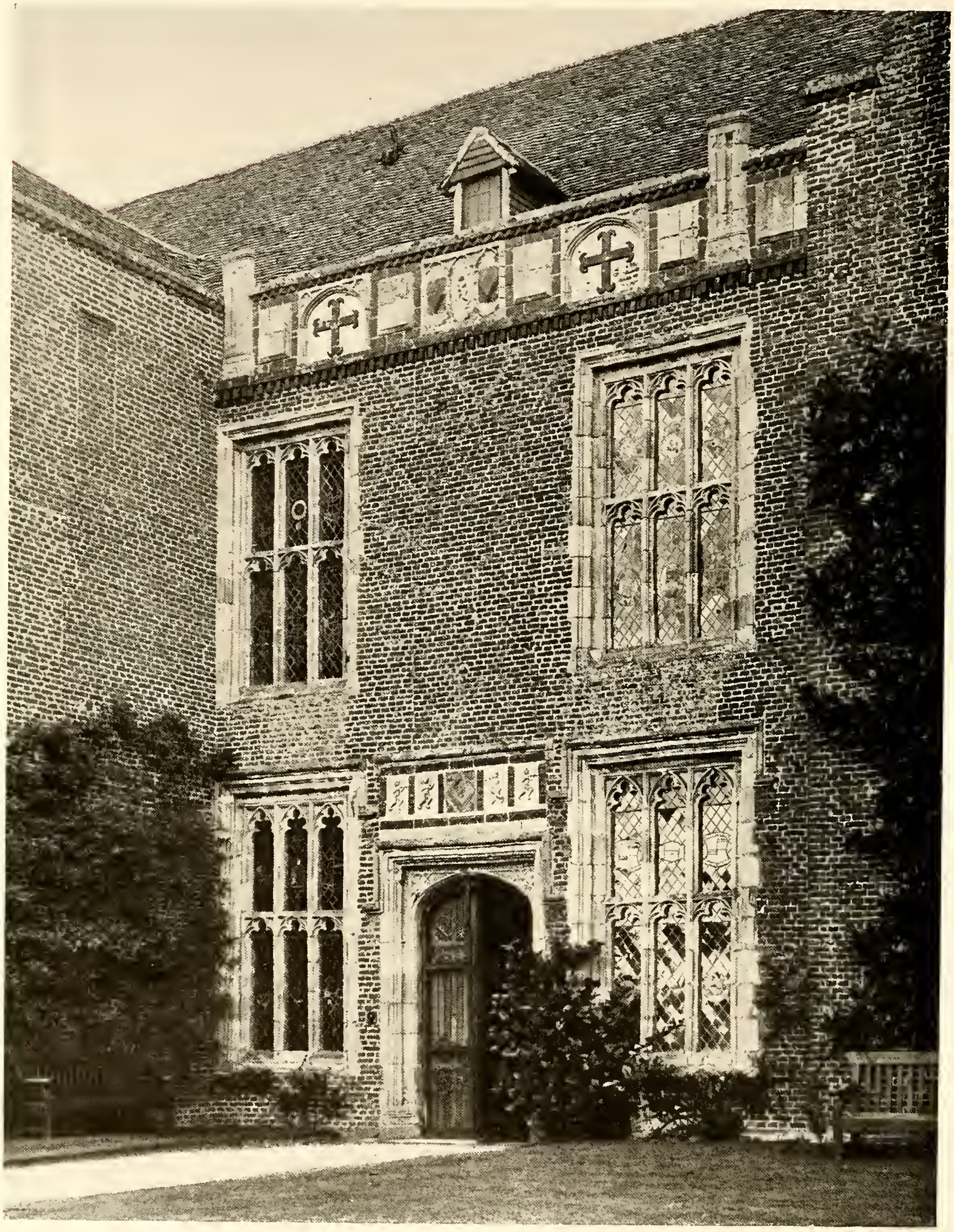
One of the finest brick towers in English church architecture. Red brick with diaper patterns in blue brick.

Tudor Brickwork

THE thirteenth century saw the beginning of native English brick building as we know it. It was the outcome of a shortage of timber, coupled with an increasing realization that a brick house was fire-resisting. The early work naturally was influenced very much by the work of the Low Countries, which directly inspired it, for the Flemings brought with them into England the art of brick building as well as that of weaving. Local conditions, however, and the individualism of the English workman, wrought a change, and by the time of the Tudors there was developed a distinctive style of English brick building.

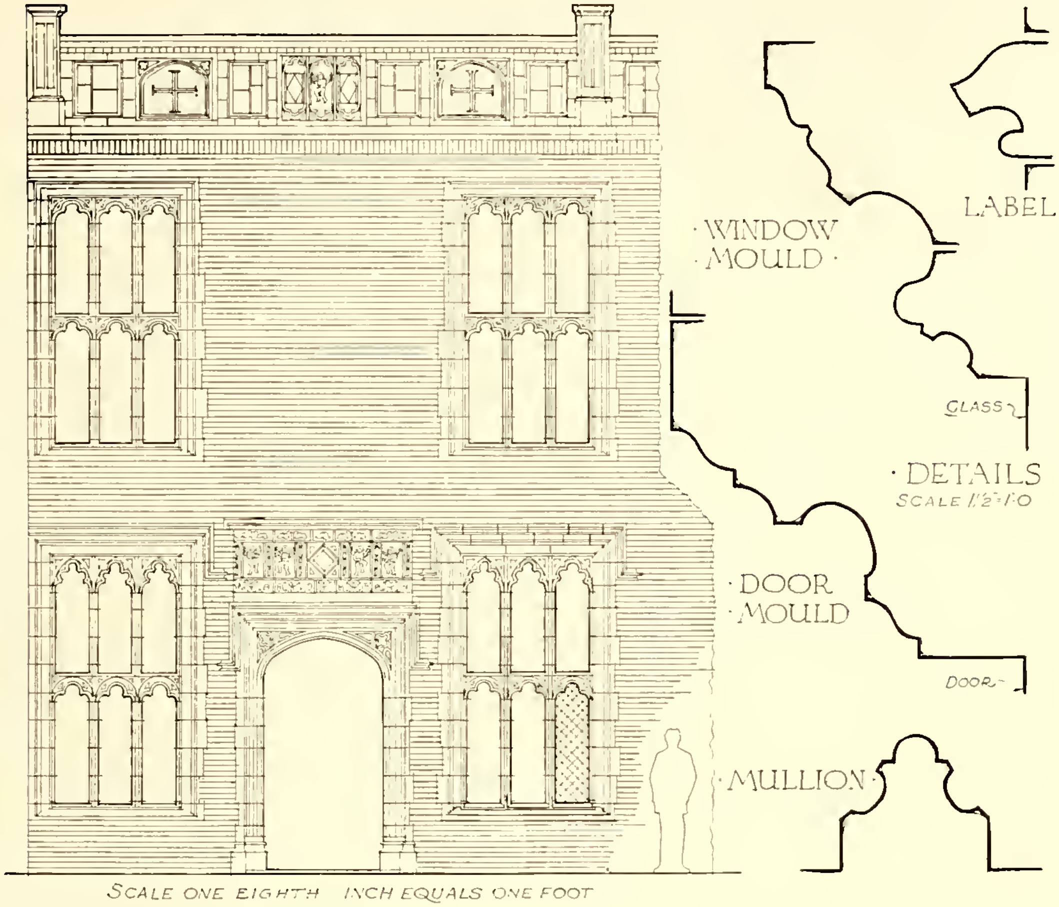
Brick was early used in church buildings, and there are some splendid examples of these to be seen in the Eastern Counties. One among many which may be cited is the tower of Ingatestone Church, Essex, a magnificent piece of fifteenth century brickwork. In cottages and the smaller houses brick was found to be a suitable filling for half-timber framing, and this brick nogging took intricate forms of much interest. In Tudor brickwork diaper patterns were also largely used. These diapers arose from the accidental effects of vitrified headers. The commonest diaper is a continuous diamond, and it is to be noted that richness of effect was sought after rather than regularity of pattern. Door and window openings were finished in stone, except when the more convinced brick builder, by constructing his arches, mullions and transoms in brick, gave to his work the satisfaction of completeness in one material. Brick corbeling is a marked feature of the style, varying widely in its treatment. All the great gateways have brick corbeling, this treatment retaining a strong Gothic tradition until well into the sixteenth century, as at Layer Marney. Brick chimneys are another noteworthy feature of Tudor houses.

Early in the sixteenth century there came a new feature—the introduction of terra cotta in the form of decorative emblems and architectural embellishments. This was one result of foreign influence, mainly the work of Italian craftsmen who were imported by Henry VIII. We see it used on an extensive scale at Sutton Place, Guildford, which is one of the great houses of the Henry VIII period; but this introduction of terra cotta was a passing phase, and the new material was used only on houses of great importance. The main bulk of the Tudor work was carried out in brick alone.



DETAIL OF SOUTH ELEVATION
SUTTON PLACE, GUILFORD, SURREY

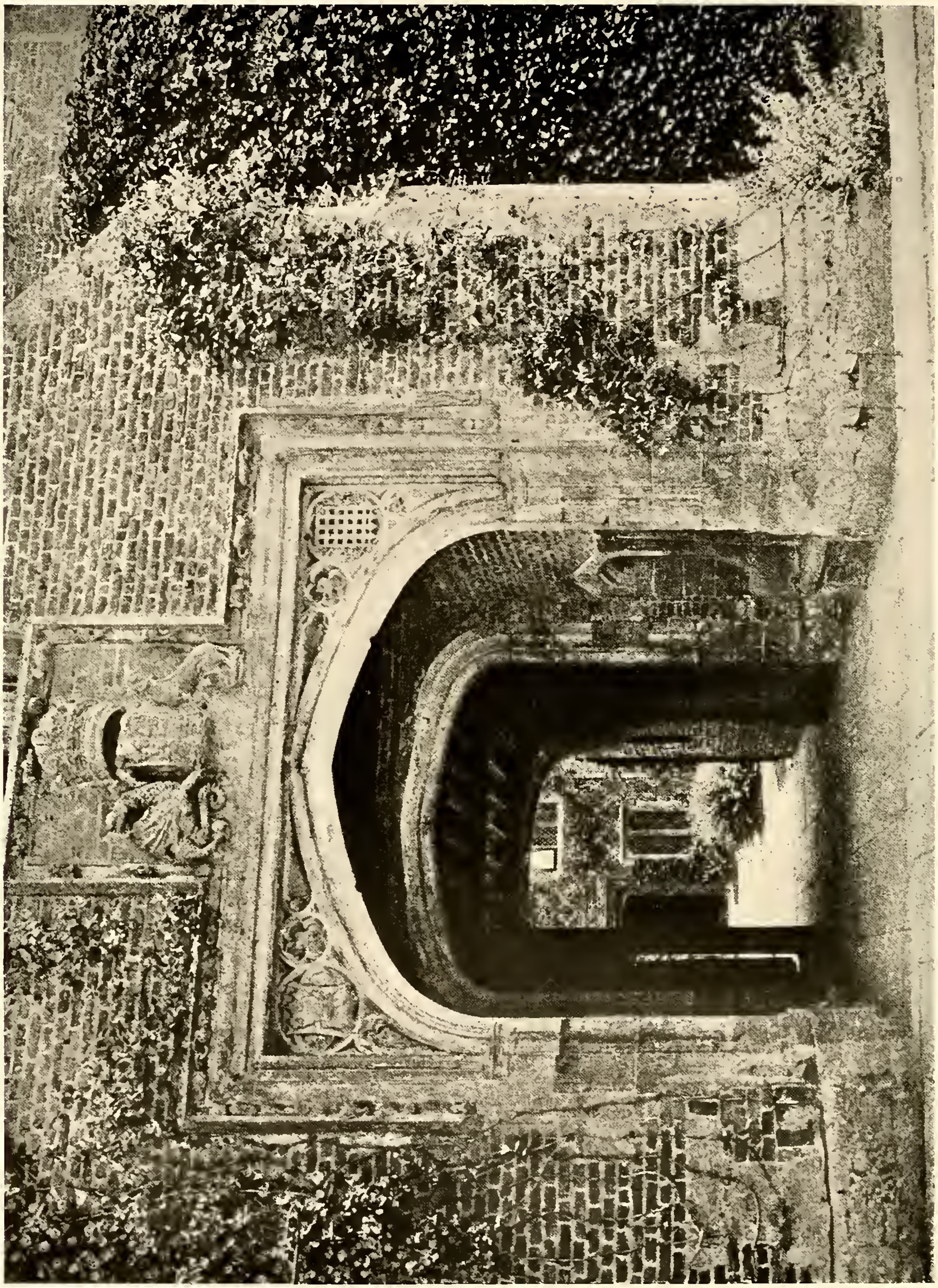
Good example of Tudor brickwork, built about 1525 by Sir Richard Weston. The walling is relieved by diaper patterns and terra cotta trim.



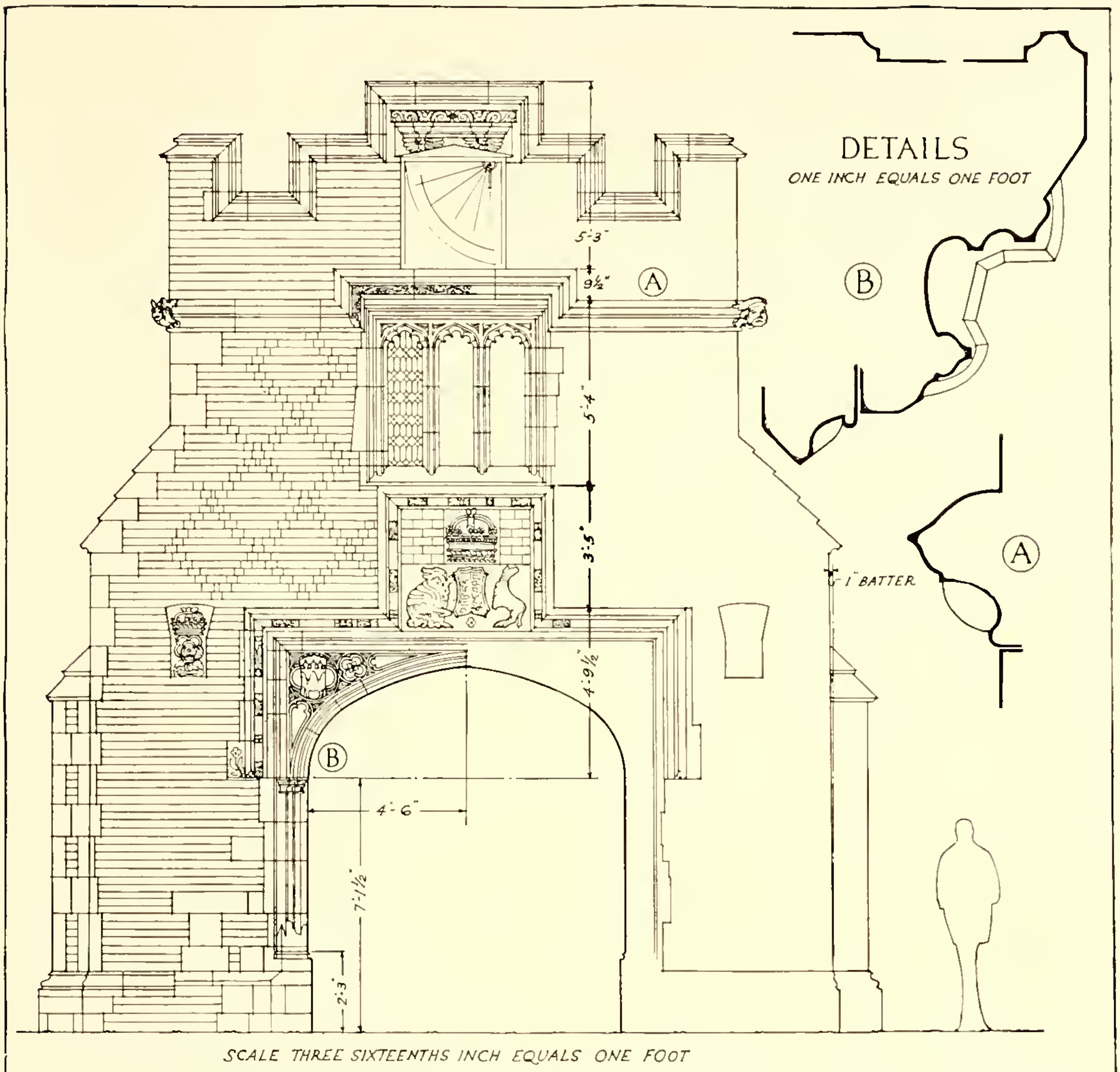
· DETAIL · SOUTH · ELEVATION · SUTTON · PLACE, · GUILDFORD, SURREY · ENGLAND ·

THIS Tudor building shows the influence of the Italian workmen brought to England by Henry VIII. It is one of the few examples of the use of terra cotta for trim; the detail is curiously of Italian derivation on Gothic forms. The brickwork predominates throughout, rich in color and texture and with a diaper patterned surface. In color the brick is a beautiful salmon red, fading to buff with darker accents; the diaper, eleven courses high, is formed with bluish toned headers so light in some places that the pattern fades into the general sparkle of the whole mass.

The bricks average in size 2 x 8¾ inches, the dark headers 2 x 4½ inches, and are laid up with alternate courses of headers and stretchers except where the diaper pattern interferes. The joints are large, varying from ½ to ¾ inch, and the mortar is a coarse mixture of sand and lime, neither raked nor pointed. The terra cotta trim was originally in shades of red and orange, but is now faded to grayer tones that combine admirably with the salmon and blue of the brick. A wonderful harmony of color plays over the whole exterior wall surface.

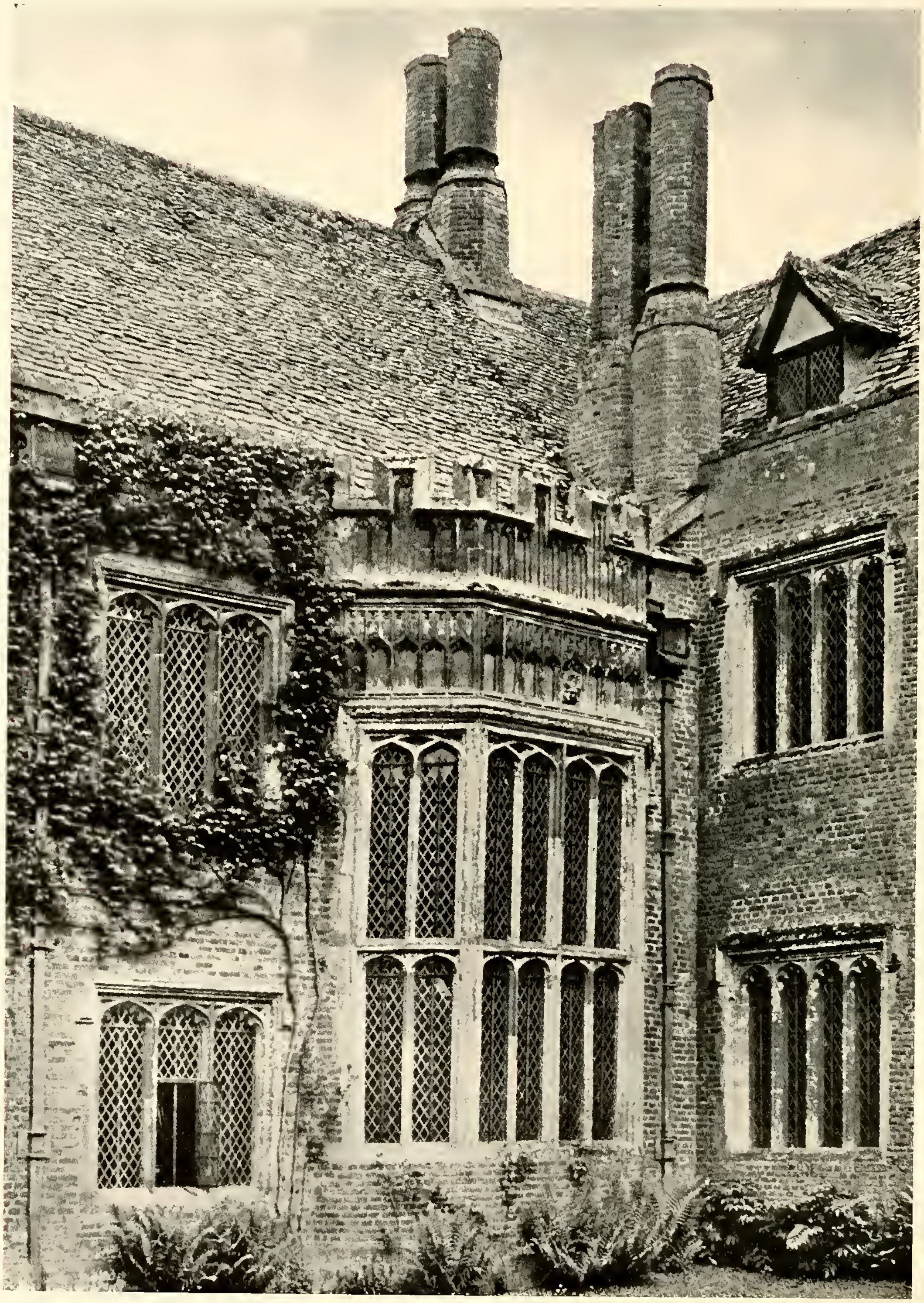


ENTRANCE DETAIL, COMPTON WYNYATES, WARWICKSHIRE



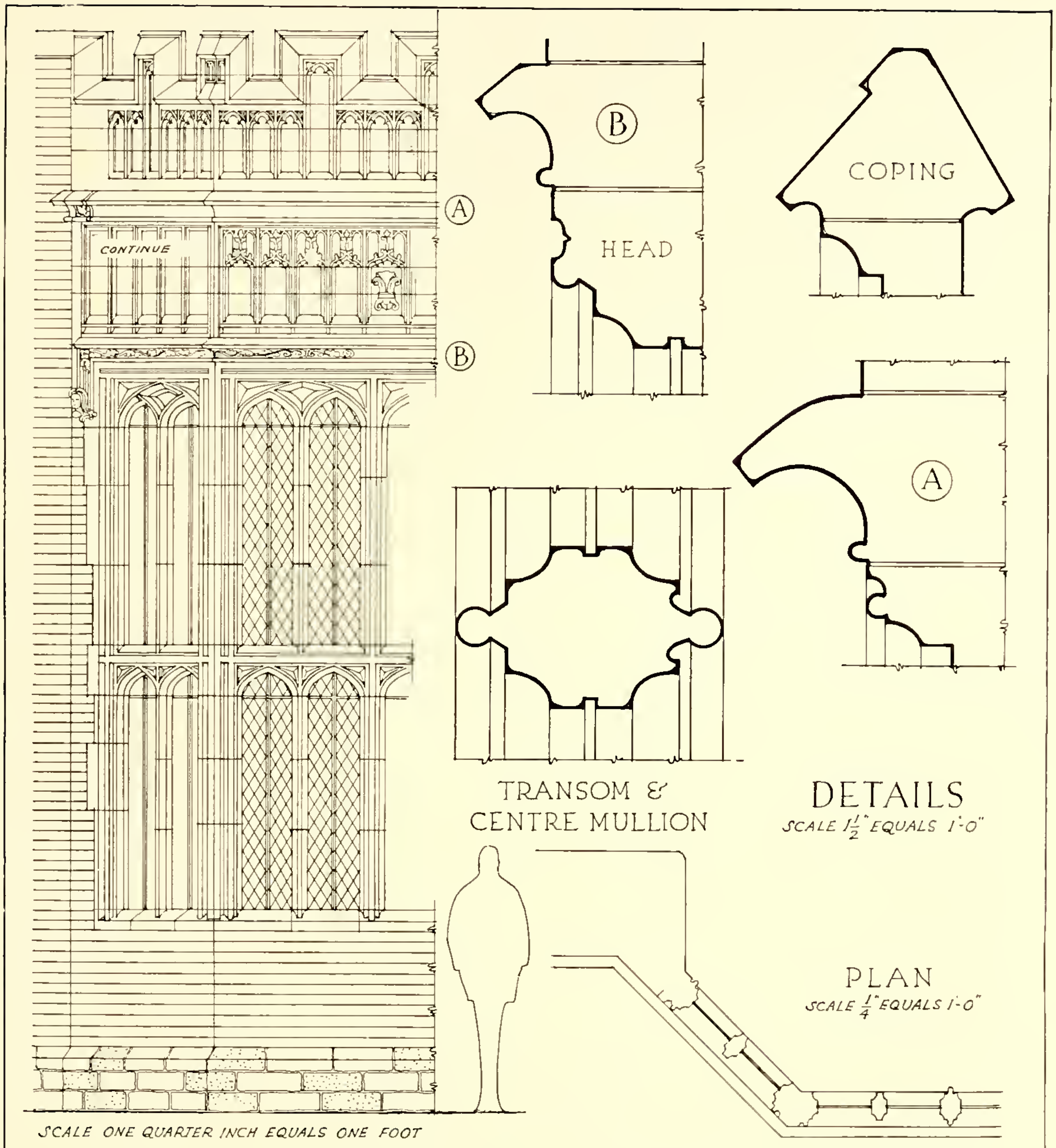
ENTRANCE DETAIL - COMPTON WYNYATES. WARWICKSHIRE

COMPTON WYNYATES is England's finest brick manor house. Its Tudor chimneys, all of carved and moulded brick, are the most remarkable in the kingdom. The main entrance porch is the most striking motif with its broad archway, surmounted with the arms of Henry VIII. One material predominates throughout — a small red brick with wide cream colored mortar joint. The stone in the porch is subservient to the brick, and placed as it is with Gothic indifference to arrangement or structurability, it seems a part of the brickwork. The bricks are in texture like over-burnt bricks of today; in color they range from salmon to buff, with occasional sparkling bronzes and blues for patterning; in size they are 9¼ x 2¼ inches throughout. The exquisite coloring of the brick, the lichen-covered roof, the broad lawns, the ivy disclosing just the right proportion of wall — all combine to make a picture that is unusually beautiful.



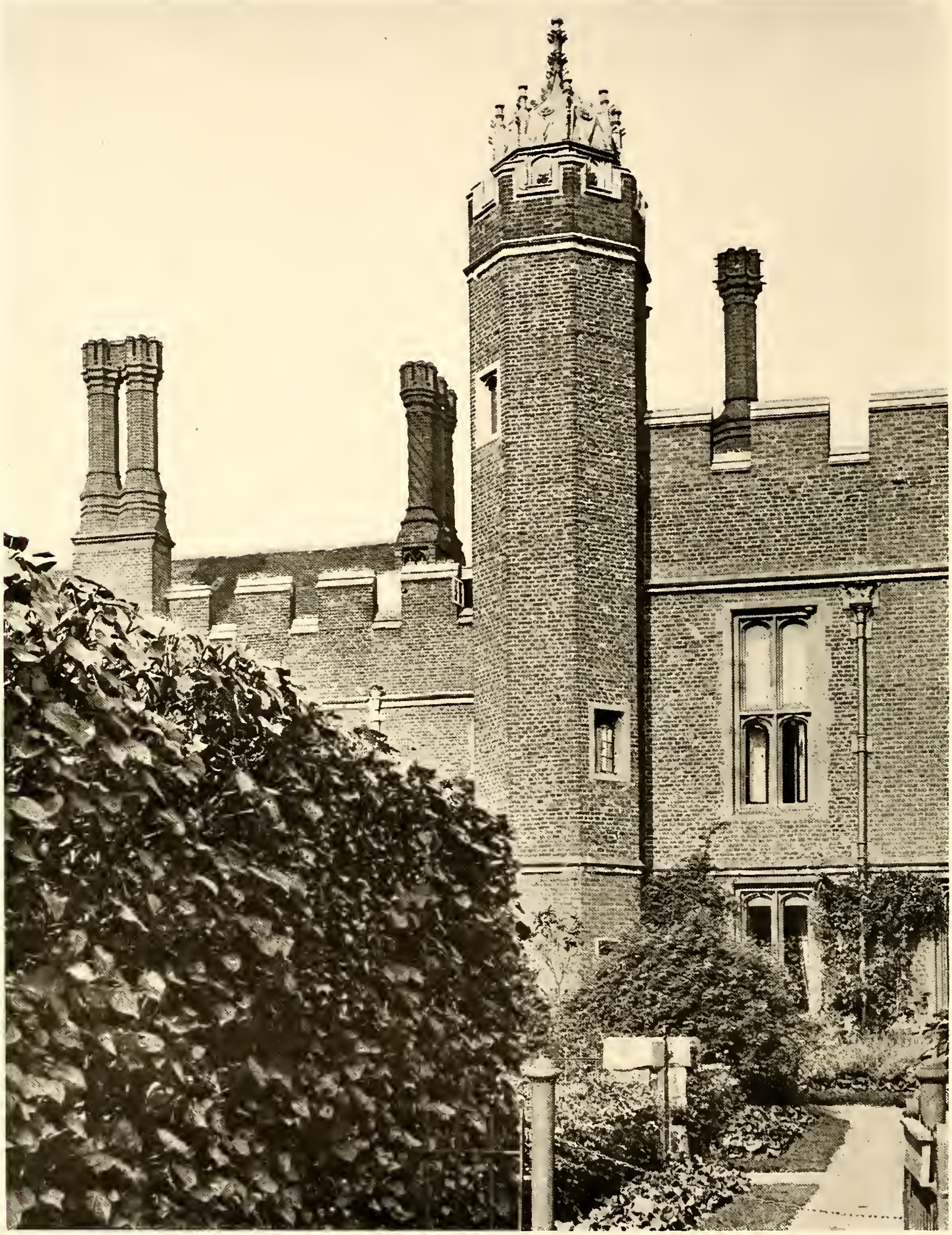
BAY WINDOW OF GREAT HALL,
COMPTON WYNYATES, WARWICKSHIRE

Although the moss and stains of centuries have obscured the patterns in the brickwork, they add beauty to the color of the walls.



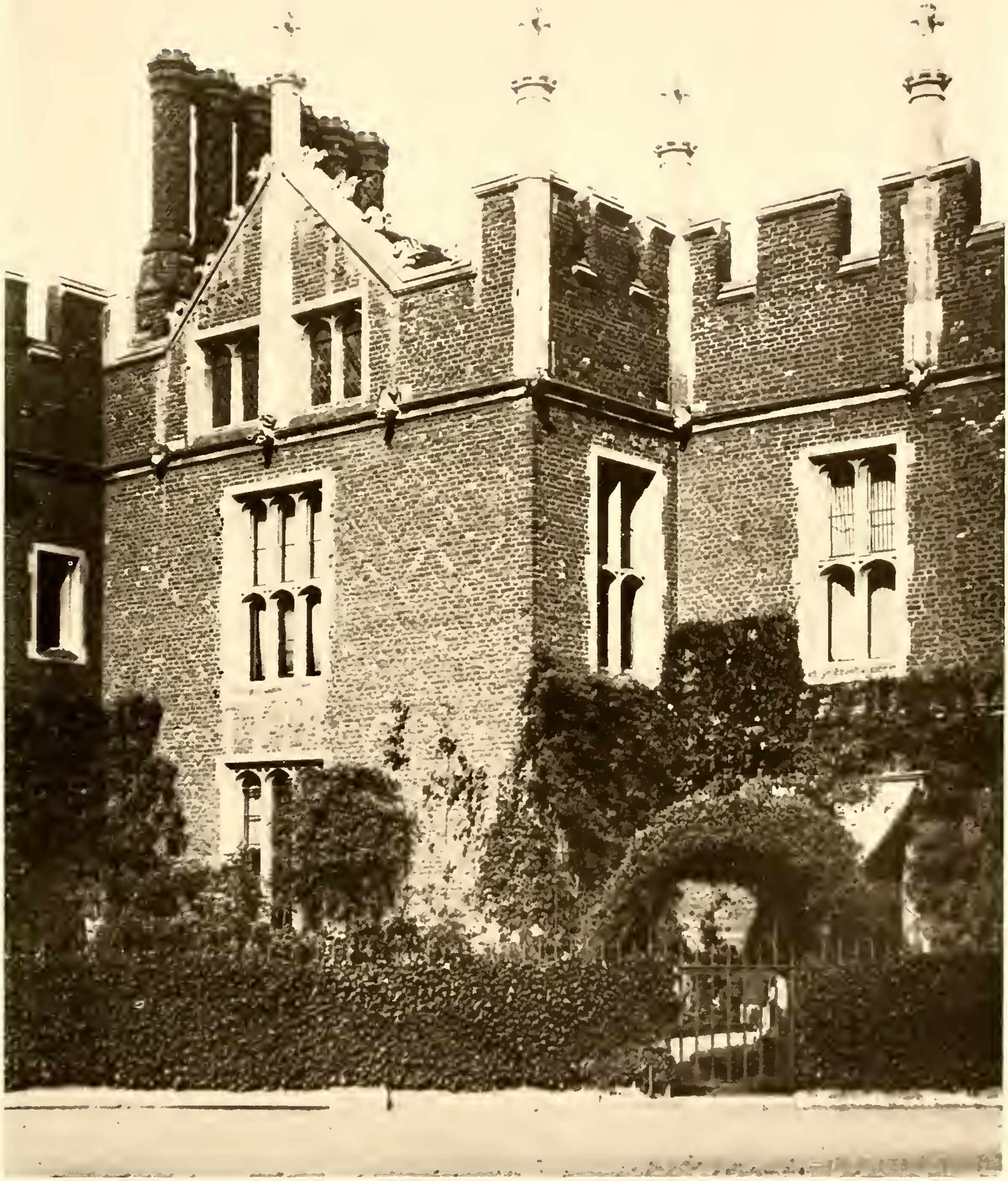
BAY WINDOW OF GREAT HALL,
COMPTON WYNYATES, WARWICKSHIRE

CERTAIN parts of this fine old country house have been standing for almost 400 years. Built in rambling fashion, it constitutes a picturesque mass of rarely beautiful coloring. The walls of small, red brick with wide mortar joints, are relieved by diapers which are subtly worked out in brick of a blue tone. Added to the richness of the brick walls themselves there is the color of the mouldings and facings in yellow stone, the woodwork of various gables now black with age and roofs of lichens-covered slate.



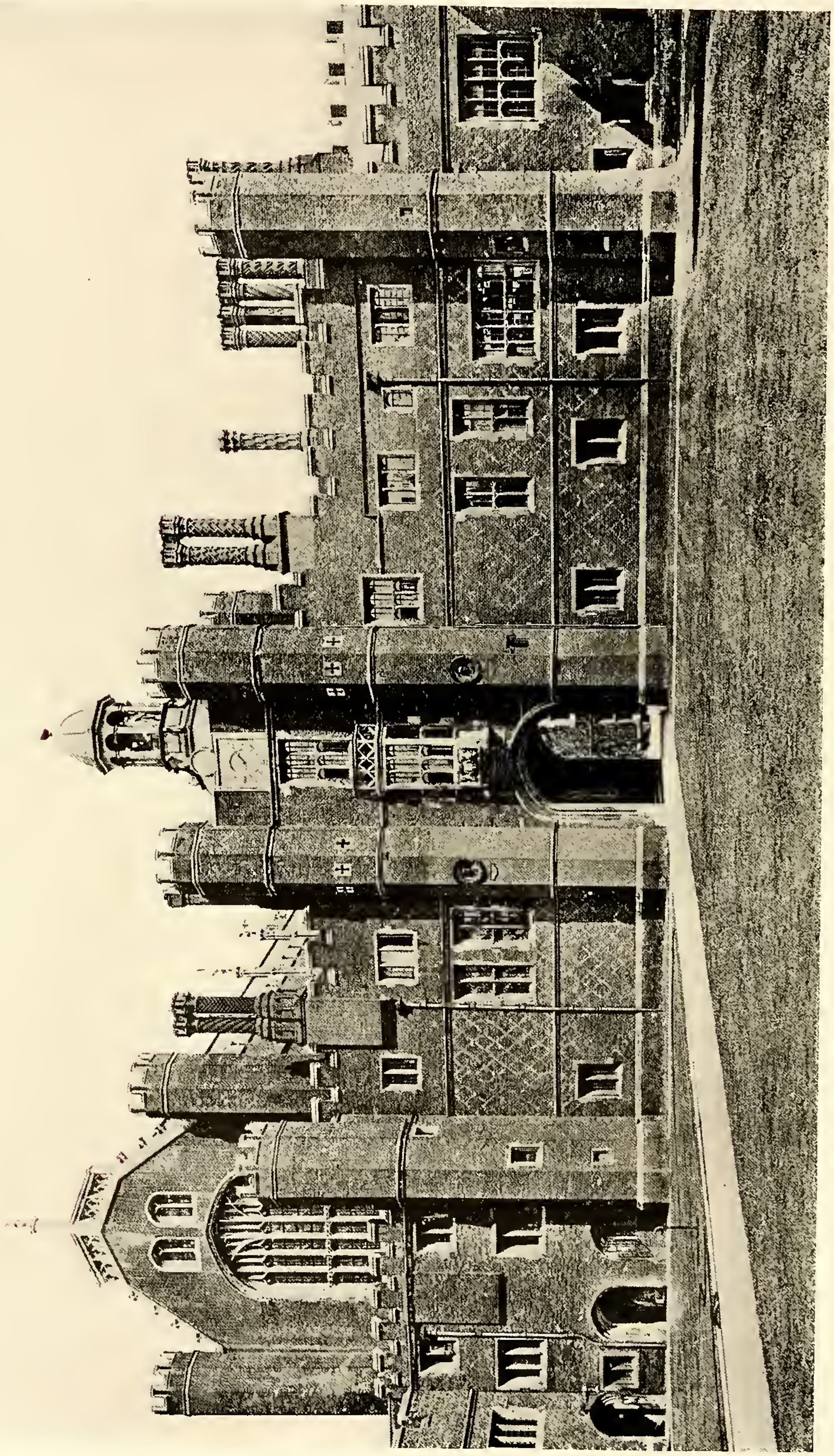
A PORTION OF THE TUDOR WORK
AT HAMPTON COURT PALACE, MIDDLESEX

Much of Wolsey's building was destroyed when the palace was rebuilt by Wren.

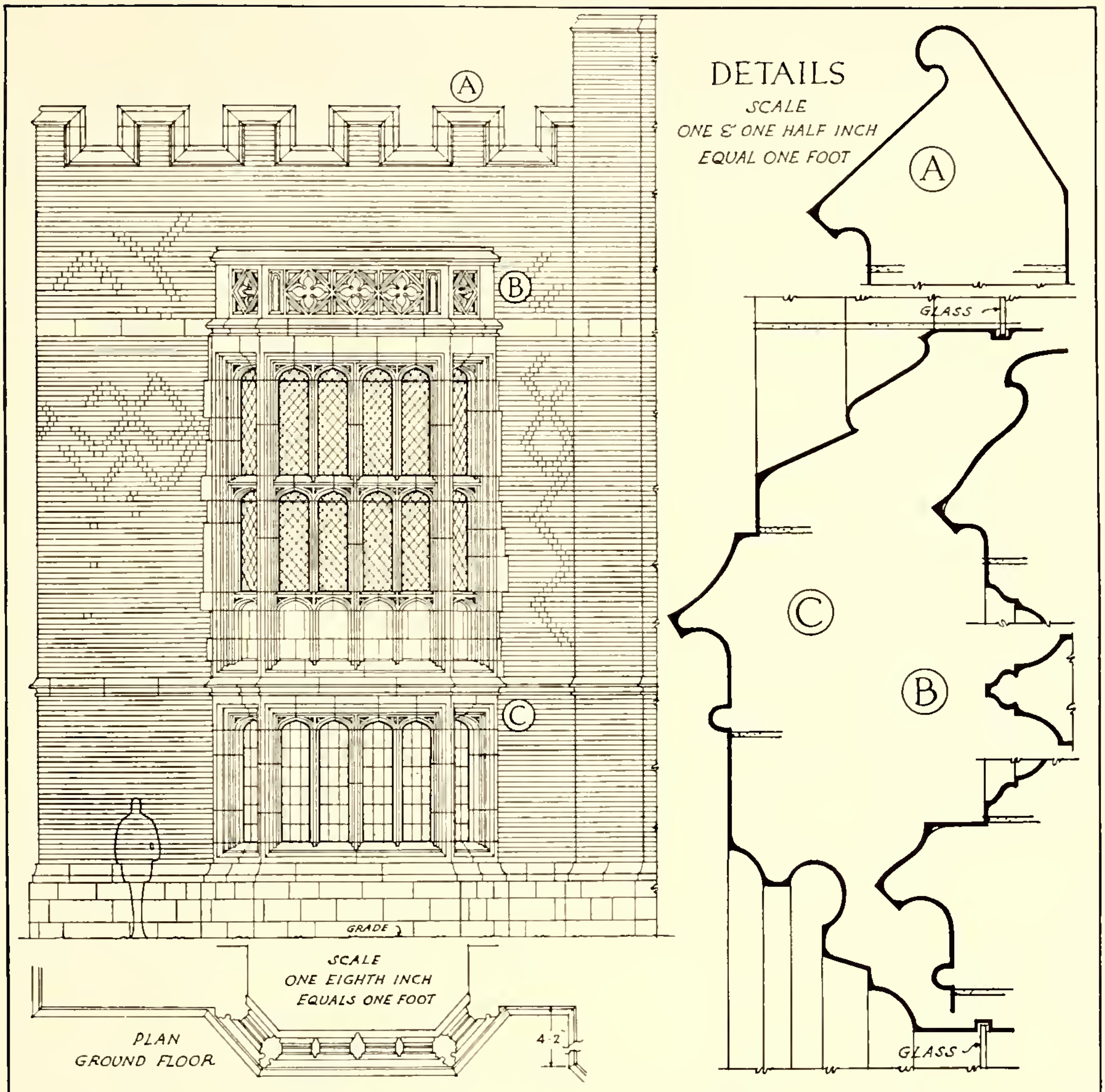


ANOTHER FRAGMENT OF THE TUDOR WORK AT HAMPTON COURT PALACE, MIDDLESEX

The cluster of chimneys seen in this illustration are not original but of the 19th Century.



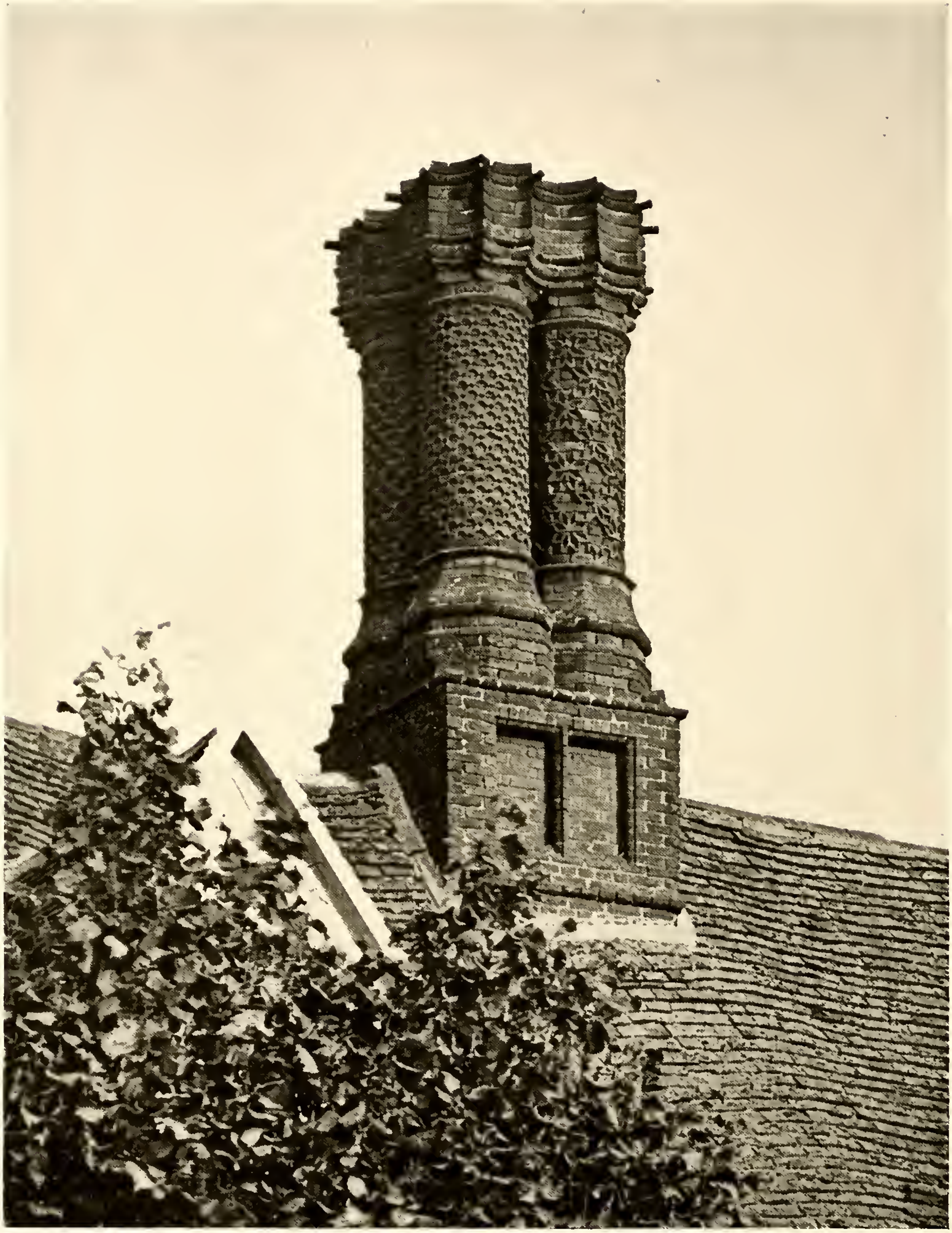
ENTRANCE COURT, HAMPTON COURT PALACE, MIDDLESEX
TUDOR PORTION BUILT 1515-1520 BY CARDINAL WOLSEY



BAY WINDOW TO WOLSEY'S ROOMS
HAMPTON COURT PALACE, MIDDLESEX

HAMPTON COURT has been called the English Fontainebleau or Versailles. Begun in 1514 by Cardinal Wolsey its splendor so aroused the royal jealousy that the cardinal presented the estate to the king.

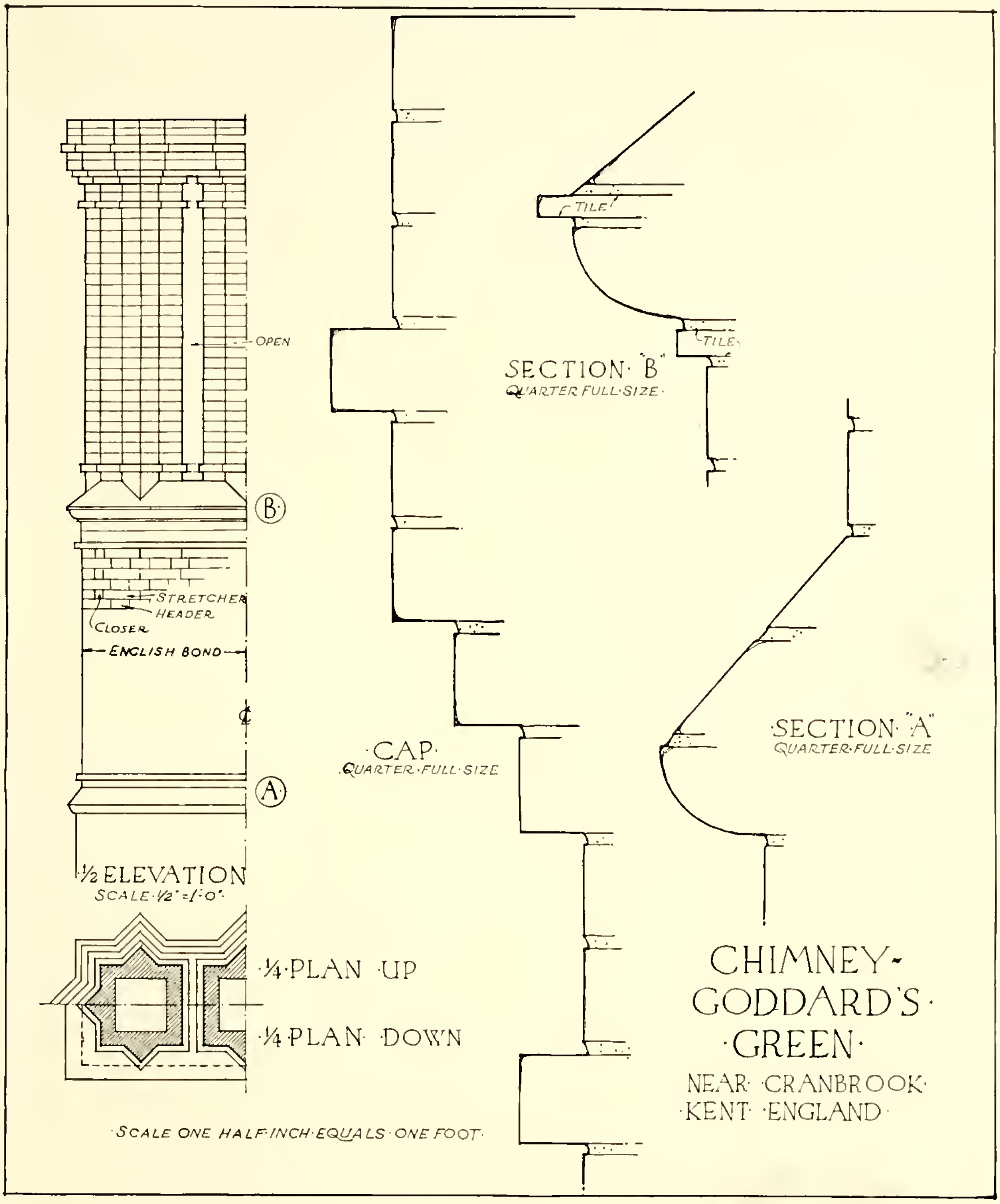
Although during the reign of Henry VIII England was filled with foreign craftsmen of every kind, the king in completing Hampton Court employed only English workmen, so that here the handiwork of native craftsmen is seen at its best. The color of the brick, and the rich and mellow tints of the stone combine to make a beautiful picture. The palace is unrivaled as a work of the Tudor builders, for notwithstanding the rebuilding under Wren during the seventeenth century it does not differ materially in parts from what it was during the Tudor period.



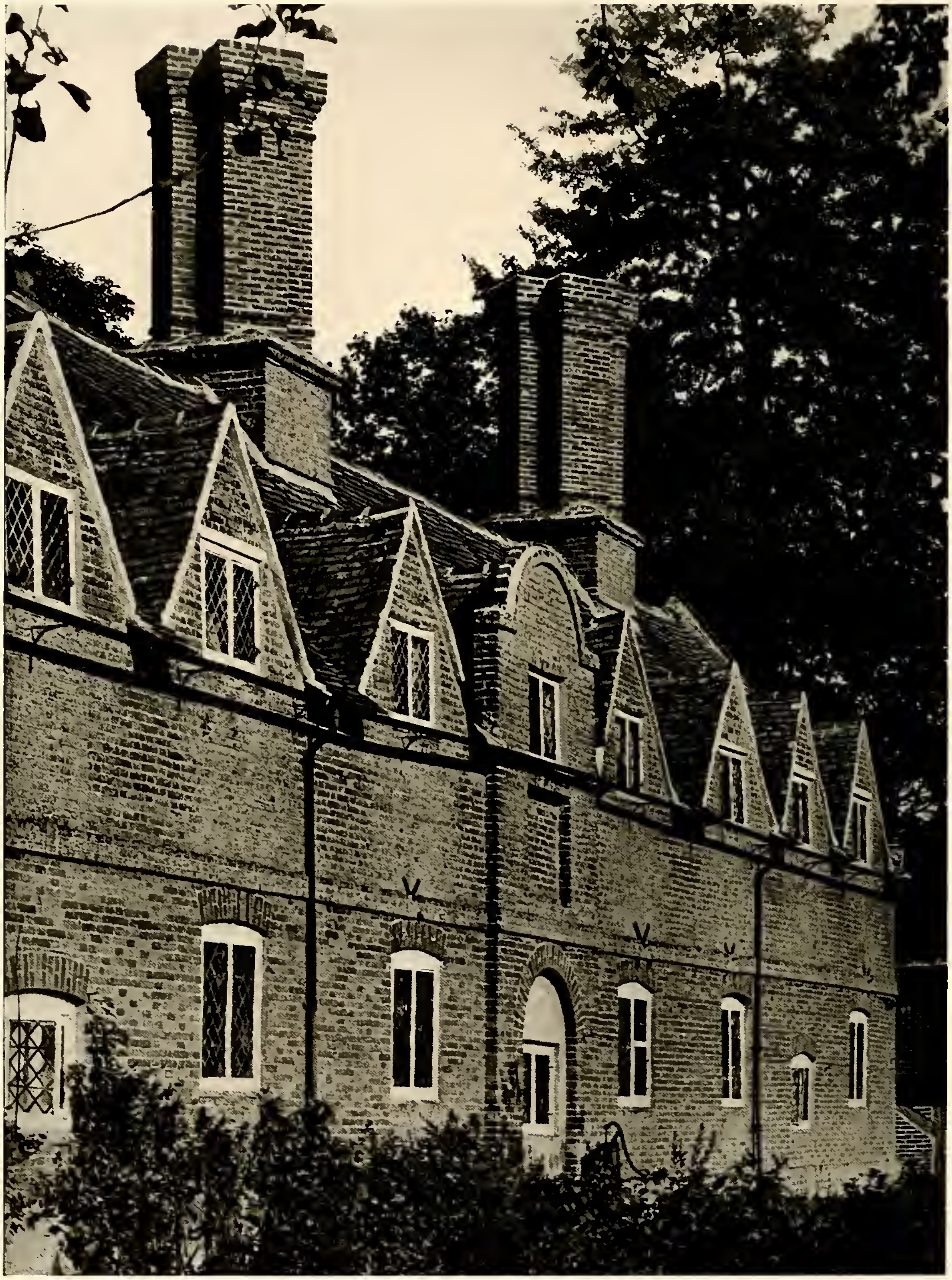
CHIMNEY STACK AT NEWPORT, ESSEX
SHOWING VARIED TUDOR DESIGNS

A delightful specimen of cut and moulded brickwork, and a monument to the skill of Tudor brick craftsmen.

TUDOR BRICK DETAILS

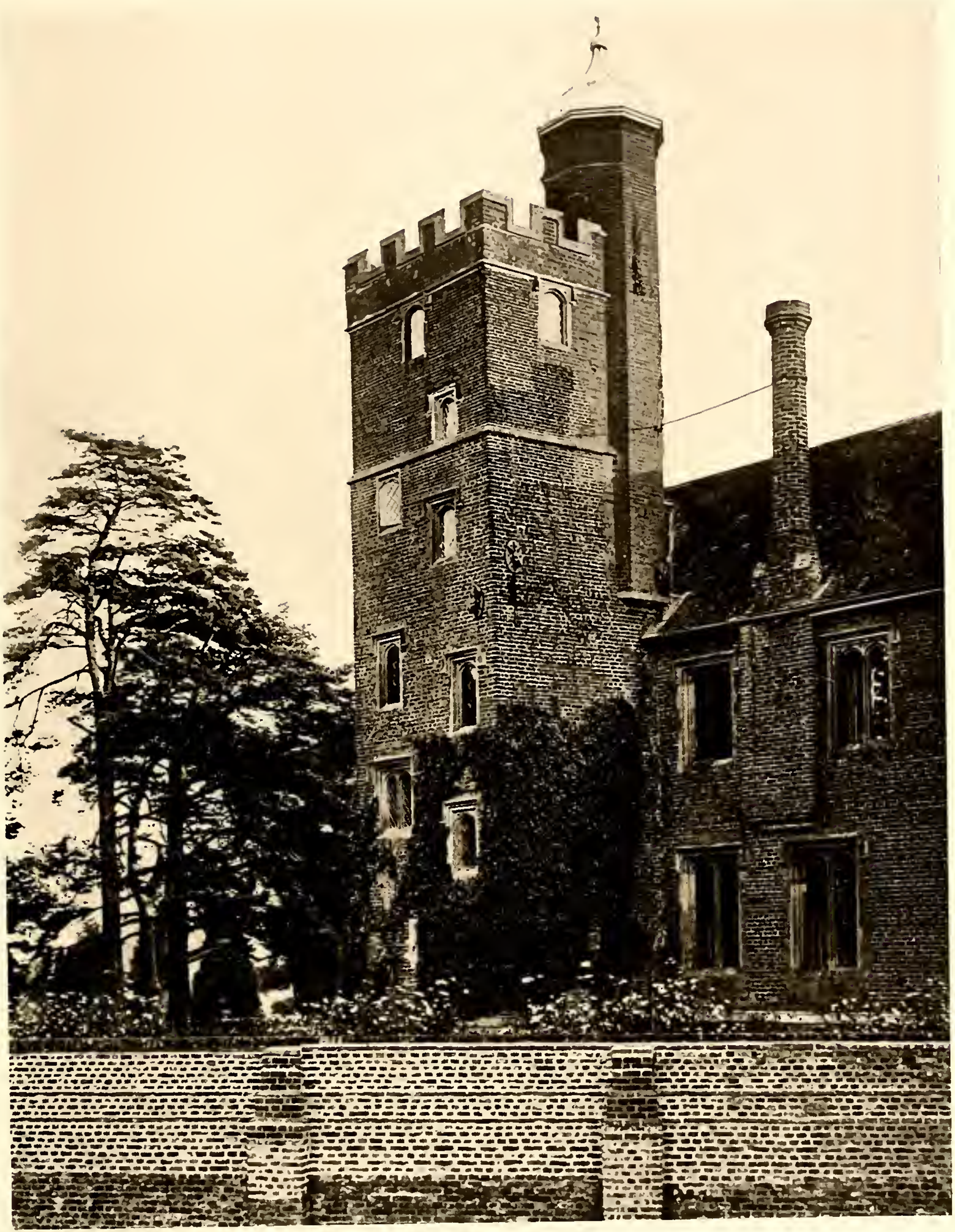


TUDOR spiral stacks were undoubtedly built up as cylinders and afterwards chiseled out; it is a matter of conjecture, because old documents do not reveal the method, and the bricks are too weathered to disclose tool marks. The Tudor effect may be secured at less expense by grouping the stacks as at Cranbrook where three separate chimneys were united in one design of many angles, built out of standard sized brick.



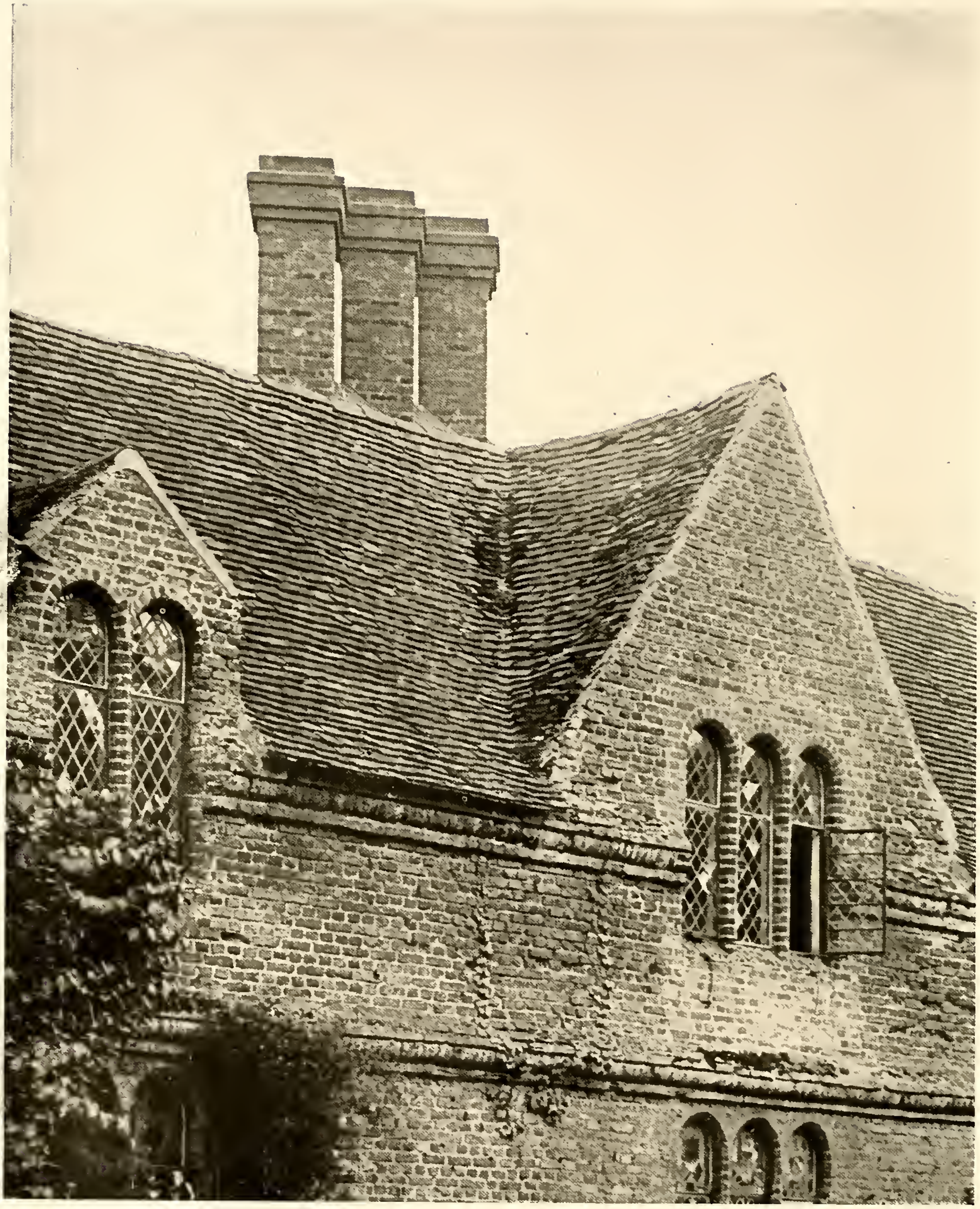
ALMSHOUSES AT QUAINTON ROAD, OXFORDSHIRE
BUILT ABOUT THE YEAR 1680

The chimneys are a modern reconstruction, but in other respects the building exhibits all the charm of original Tudor brickwork.



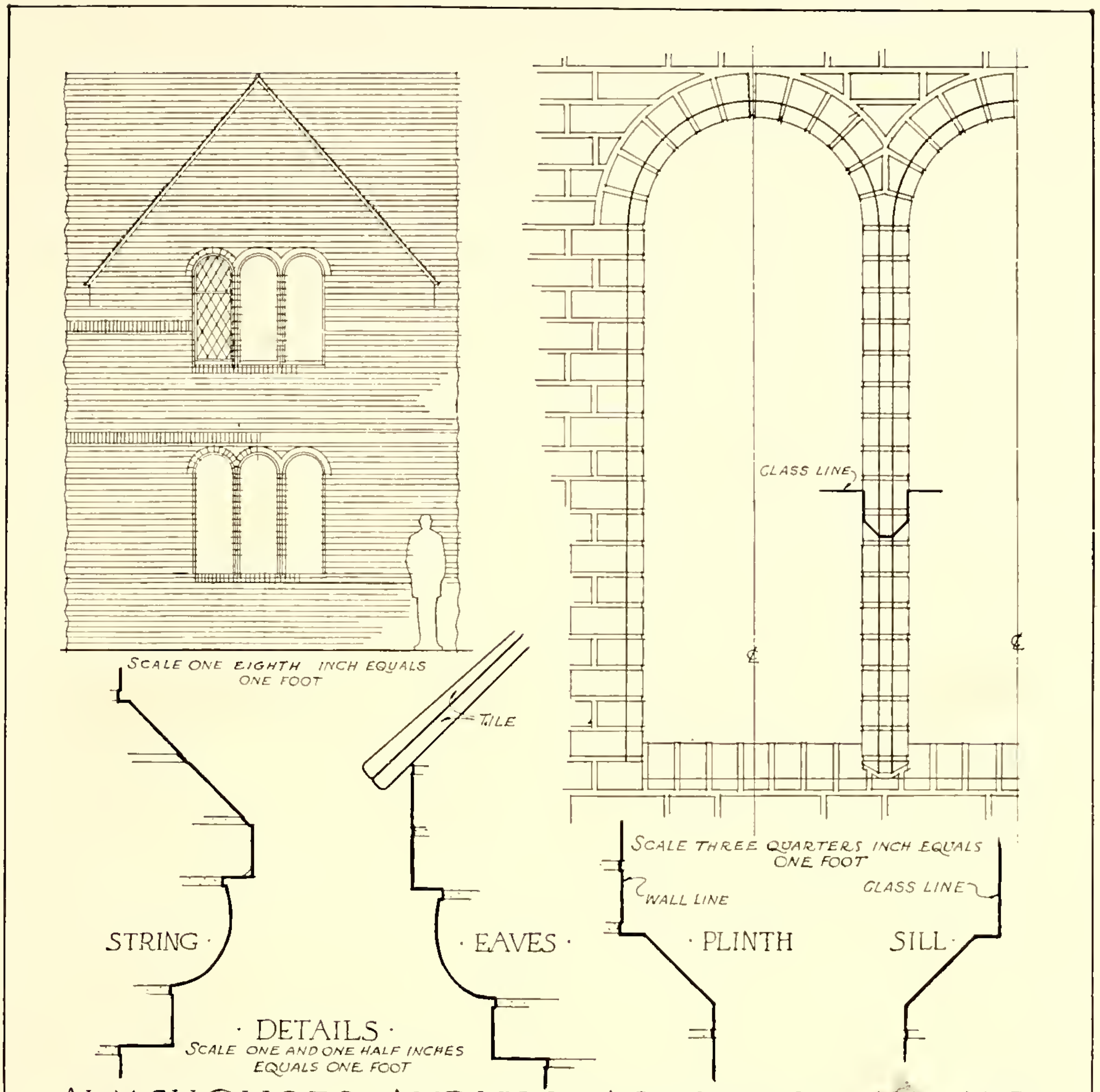
BRICK TOWER AT HORHAM HALL, SUFFOLK
DATING FROM THE LATE 17TH CENTURY

This building illustrates the beauty of English bond in brickwork and the interest derived from unsymmetrical grouping of windows.



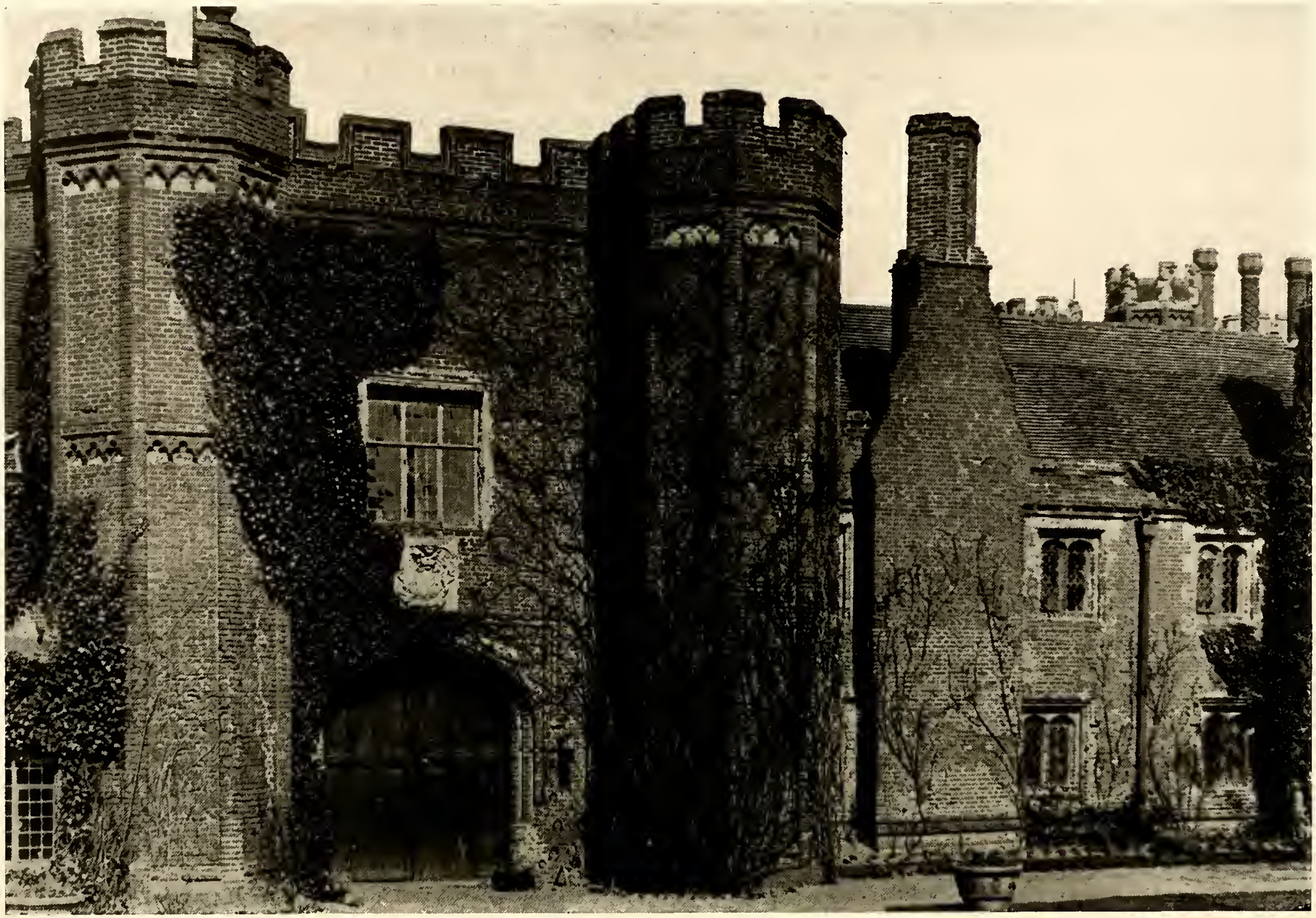
DETAIL OF GABLES,
ALMSHOUSE AT AUDLEY END, ESSEX
DATES FROM ABOUT 1600

The charm of this brickwork in the early Tudor manner is much enhanced by the cut brick string courses and the arches and mullions of the well placed and carefully proportioned windows.


SCALE ONE EIGHTH INCH EQUALS ONE FOOT
TILE
GLASS LINE
℄
℄
SCALE THREE QUARTERS INCH EQUALS ONE FOOT
WALL LINE
GLASS LINE
STRING
EAVES
PLINTH
SILL
DETAILS
SCALE ONE AND ONE HALF INCHES EQUALS ONE FOOT

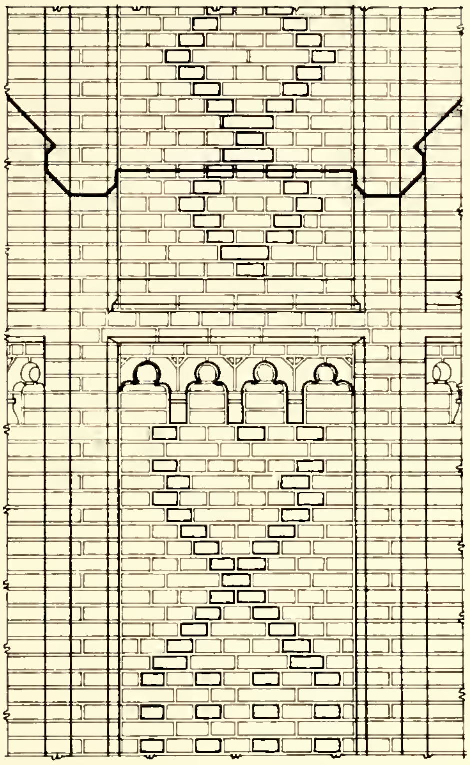
·ALMSHOUSES,·AUDLEY·END·ESSEX,·ENGLAND·

MANY of the old almshouses throughout England show delightful uses of brick. Audley End, over 300 years old, uses brick as a complete material; no dependence on stone for trim is seen, and the result is full of charm and picturesque quality. The string and sill courses and the eaves are obtained by simple brick projections and one moulded member; the brick mullions are as light as Gothic stone tracery, yet they are produced with the brick of the wall clipped at a 45-degree angle. The bricks are small, as in all Tudor work, measuring 2⅛ x 8 ½ inches; they are laid in English bond, which appears to excellent advantage in the large gable; the joint is of cream colored mortar, ½-inch wide. In color they are generally light red, with occasional darker tones in the headers ranging from bronze to blue. The chimneys in the illustration are modern.

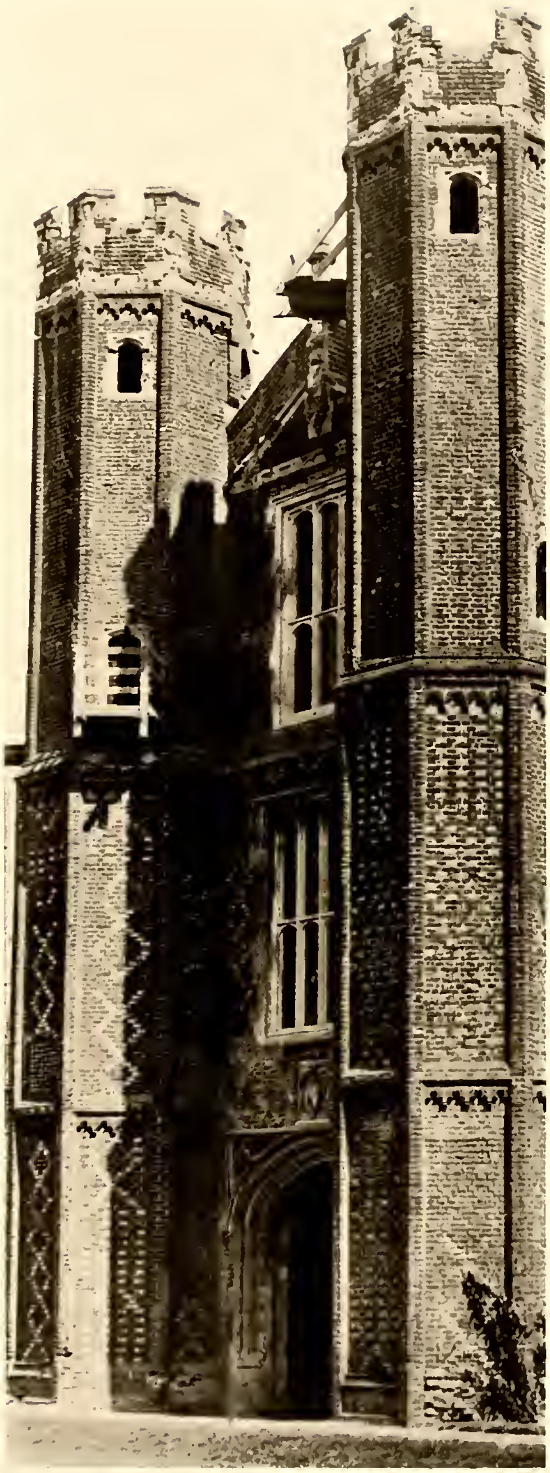


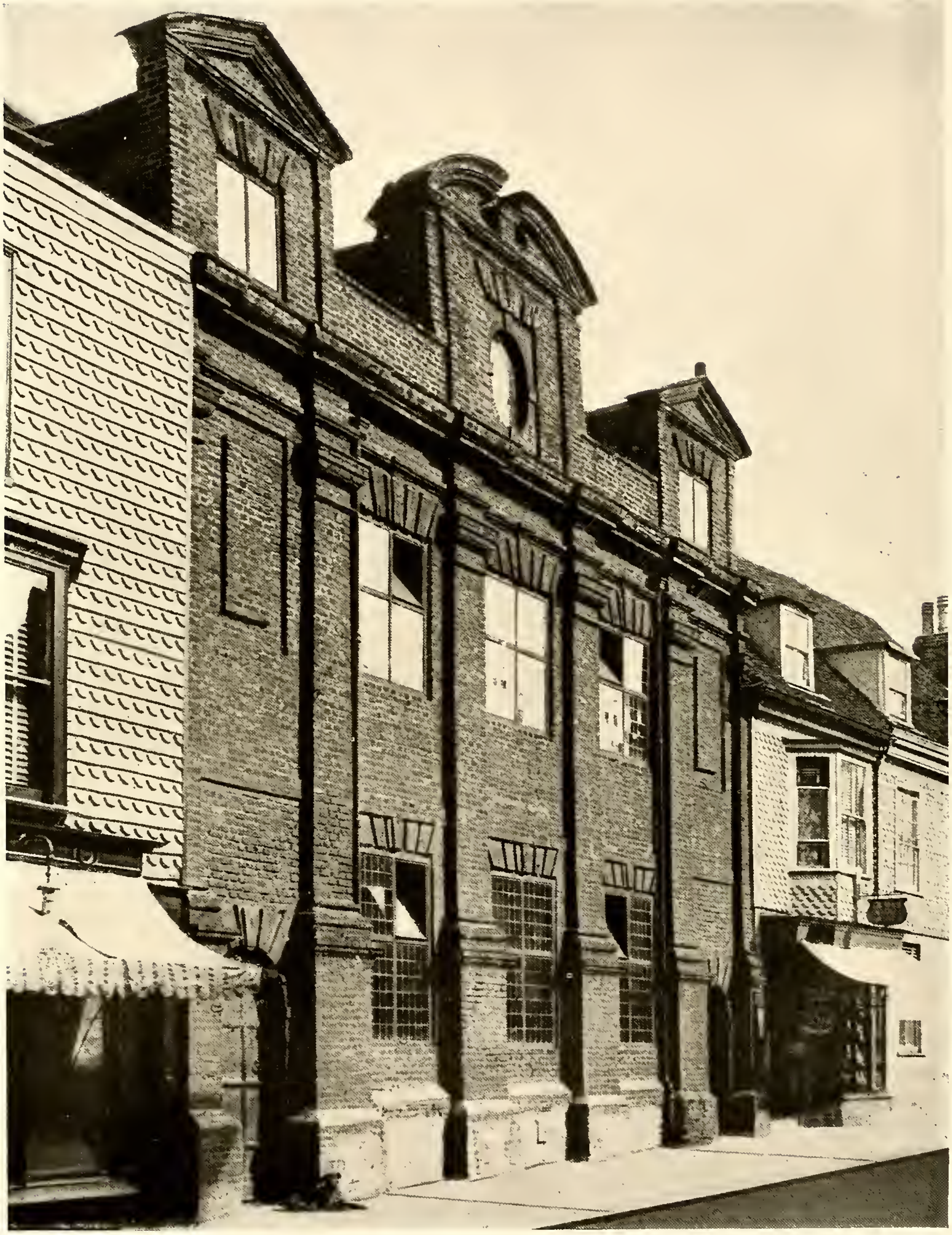
THE OUTER GATEHOUSE TO LITTLE LEIGH'S PRIORY
NEAR CHELMSFORD, ESSEX

Little Leigh's Priory was built by Henry VIII's Solicitor General but was demolished about 1753, leaving only the outer and inner gate houses and part of two sides of the outer quadrangle.


TYPICAL BRICK PATTERN
SCALE 3/8" = 1'-0"
GATEHOUSE, LITTLE LEIGHS PRIORY
NEAR CHELMSFORD, ESSEX

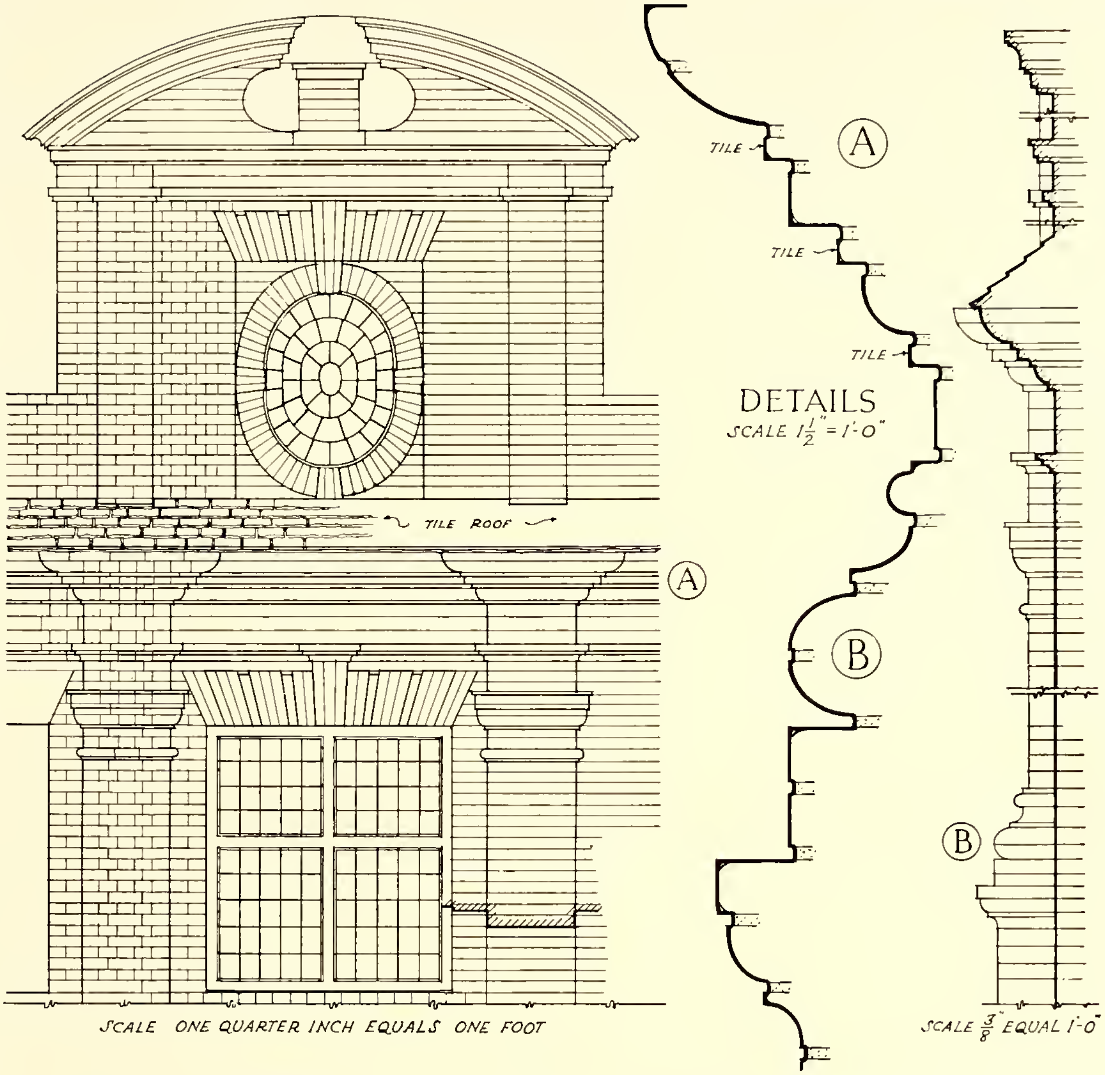
OF the buildings built (1537-1551) from material taken from older structures there remains but little of importance except two gatehouses. The inner gatehouse, leading to the fountain or inner court, is a superb example of Tudor brickwork at its best, and after almost four centuries it stands externally intact. As was usually the case with sixteenth century work, the bricks are narrow, and the use of dark, vitrified headers gives to the angle turrets relief in quite a variety of diaper patterns. The stone archway is 9 feet in width, surrounded by mouldings which are even yet crisp and vigorous. On the entrance side of the outer gatehouse the faces of the turrets are slightly recessed from the angles, forming upright panels which are 3 feet 5 inches wide, the upper and lower stages being divided by a corbeled frieze of cut brick. The arch of this gatehouse is of moulded brick.


The panels on the faces of the octagonal turrets of the inner gatehouse show a variety of diaper patterns.



THE GRAMMAR SCHOOL, RYE, SUSSEX
A COMPLETE EXPRESSION IN BRICK

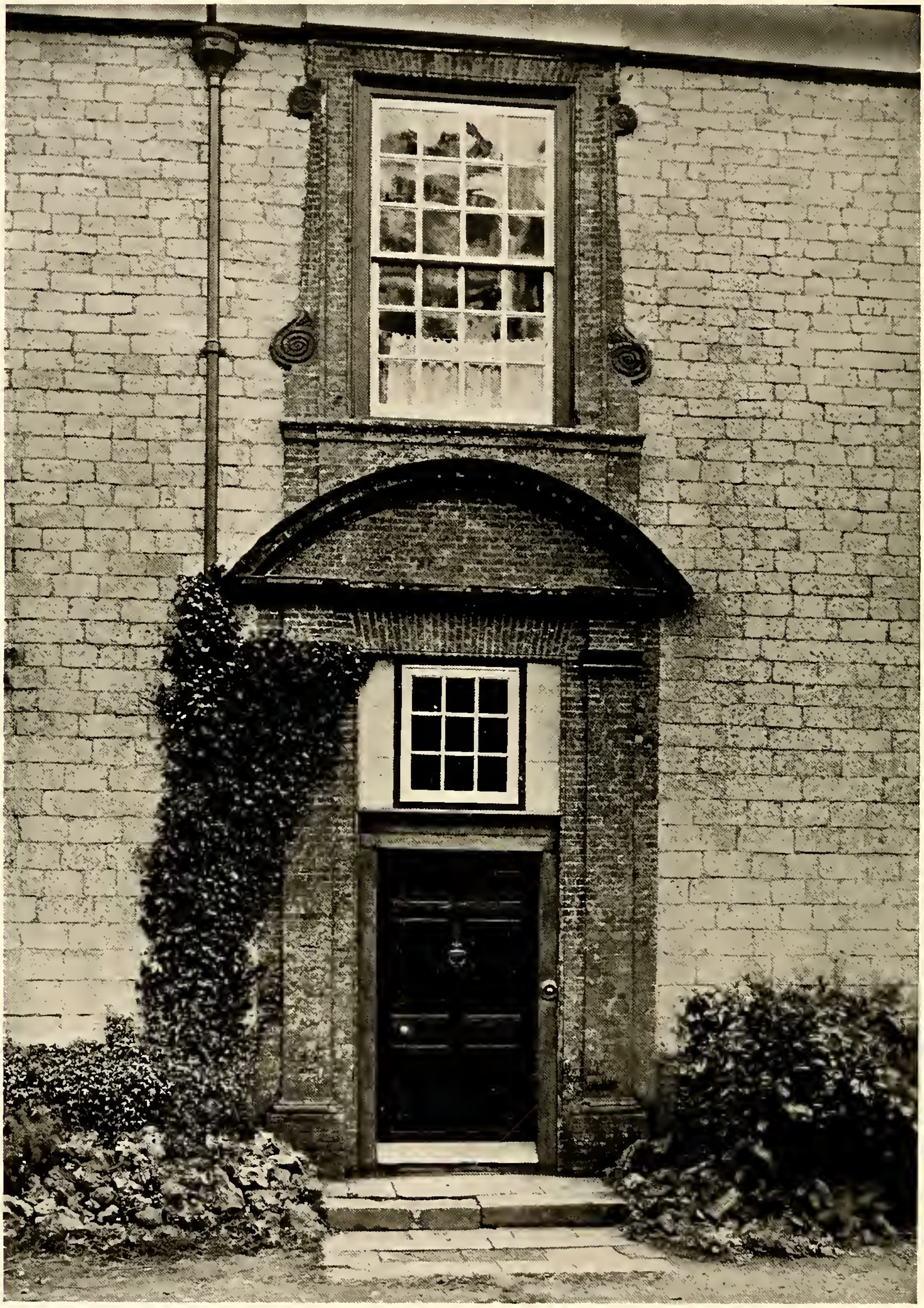
This was probably the work of a local craftsman about the middle of the seventeenth century, when cut brickwork was a comparatively new thing.



THE GRAMMAR SCHOOL, RYE, SUSSEX

ALL the vigor and symmetry of the Italian Renaissance are seen here in brick with the flavor of Holland to modify them. The work is carried out entirely in brick except for the tiles that weather the cornice and form the small fillets to the mouldings of the cornice, caps, channeled brick arches and key blocks.

The work is coarsely jointed and somewhat crudely executed, but the different members of the Tuscan order are cleverly suggested. The voussoirs over the door and window openings are of rubbed and gauged brick; laid with a fine joint and channeled, they contrast well with the cruder walling brick. A large part of the facade's distinction is achieved by simple projections; it is only in a few places that moulded brick was required. The windows are interesting in showing the retention of Tudor casements after other Tudor details had succumbed before classic models suggestive of Palladio.



DETAIL OF HOUSE AT TREYFORD, SUSSEX
GEORGIAN DETAIL SOLELY IN BRICK

The doorway and window above show rubbed, moulded and cut brickwork of the latter half of the eighteenth century.

TURPIN C BANNISTER

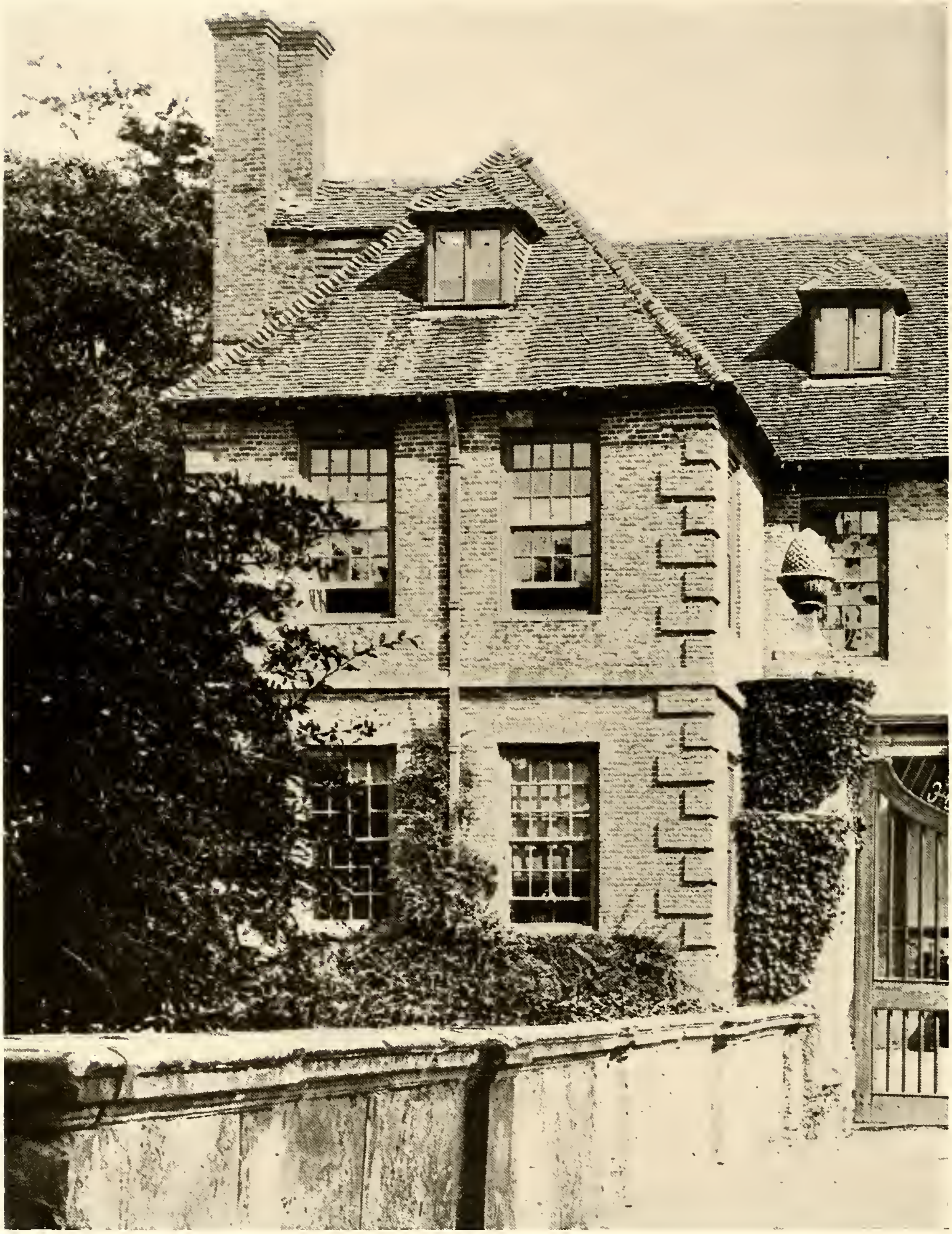
Georgian Brickwork

ALTHOUGH during the Elizabethan period brick was even more widely used than in the previous reigns, its interest and elaboration declined for a time with the advent of the Renaissance. This was chiefly due to the increasing use of stone for the ornamental features of buildings; but later, towards the end of the seventeenth century, there was a marked revival of the use of brickwork, and this continued through the eighteenth into the nineteenth century.

"Georgian" is a somewhat elastic term. Strictly defined, it embraces the 86 years covered by the reigns of the four Georges from 1714 to 1820, but such definitions and dates have no proper relation to architectural development which is always a gradual thing. Thus, in speaking of "Georgian" brickwork, we need to go back to the end of the seventeenth century when Wren was making such a brave display.

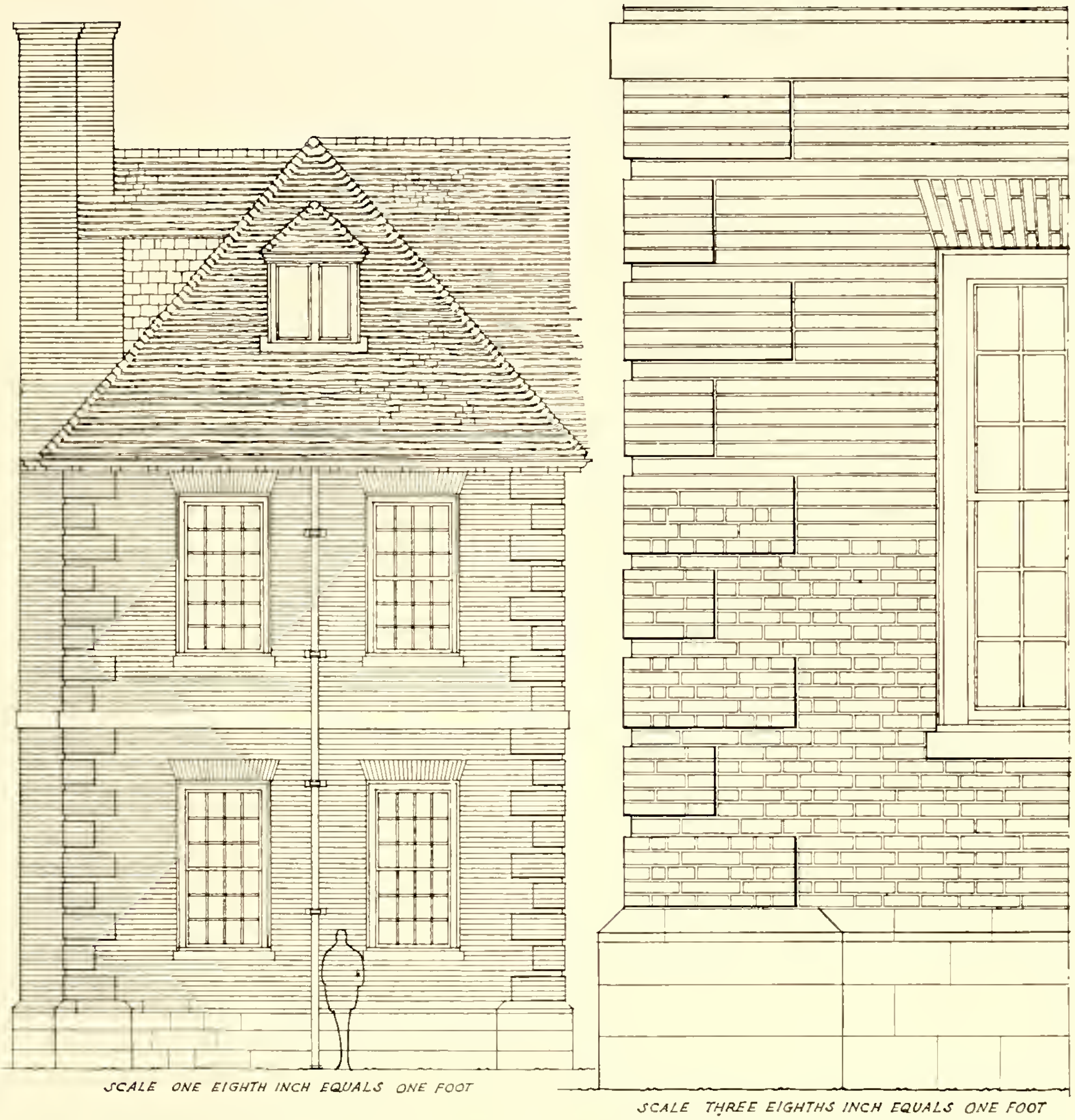
Wren's use of brick is characteristic of his natural strength and decision. For church work he evidently preferred stone, employing brick only for structural utility, as in the core of St. Paul's, or for an economical facing, as in St. James's, Piccadilly. But in domestic work he used brick continually, considering it as suitable for the palace as for a terrace house. He appears to have carefully considered the color of his brickwork, as for almost the first time he introduced yellow stocks; and the quality of Wren's brickwork was as excellent as its design. Perhaps his most careful and consistent use of it was at the Bluecoat School, Westminster, no longer existing.

What may be called the "brick style", initiated by Inigo Jones at West Woodhay, and popularized by Wren, became the vernacular for the whole of the eighteenth century. For Queen Anne and Georgian alike, brick was the medium in which were expressed the comfort and dignity of the English house. In town houses the orders are more apparent, and a quiet use of different colored bricks is a marked feature of the work. Cornices, caps and window tracery were kept in red brick, while color contrast was obtained by the use of yellow stocks. Later windows were frequently framed with moulded brick architraves. There used to be four houses in St. Martin's Lane, London, which showed a remarkably fine use of brick. The facades of these houses, embellished with the Roman Doric order, were rendered completely in brick, from the fluted pilasters to the *guttae* on the soffit of the cornice.



DETAIL OF WING
GROOMBRIDGE PLACE, KENT

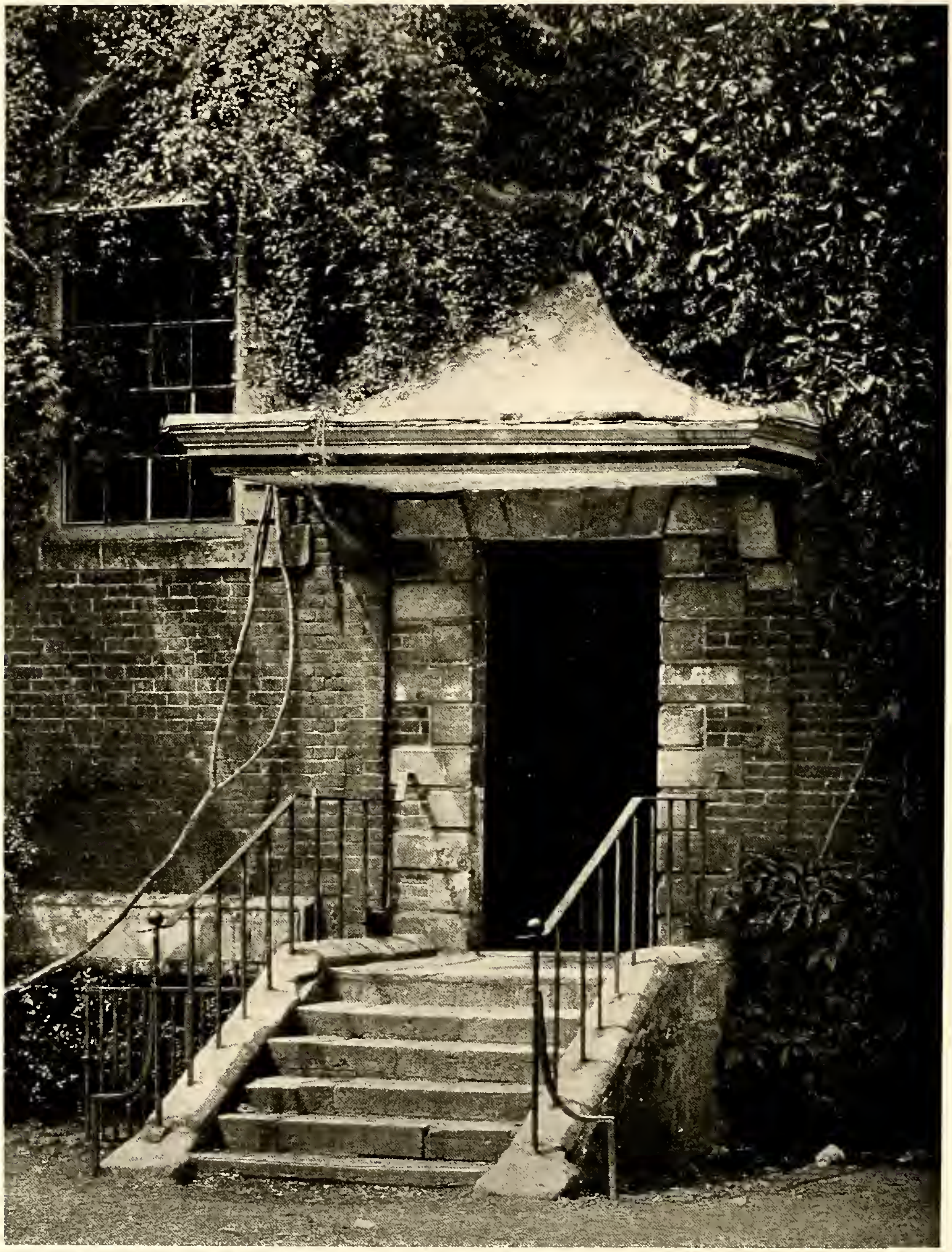
Though he may not have been responsible for carrying it out, Wren's directing hand is evident in the executed work


SCALE ONE EIGHTH INCH EQUALS ONE FOOT
SCALE THREE EIGHTHS INCH EQUALS ONE FOOT

DETAIL OF WING, GROOMBRIDGE PLACE, KENT.

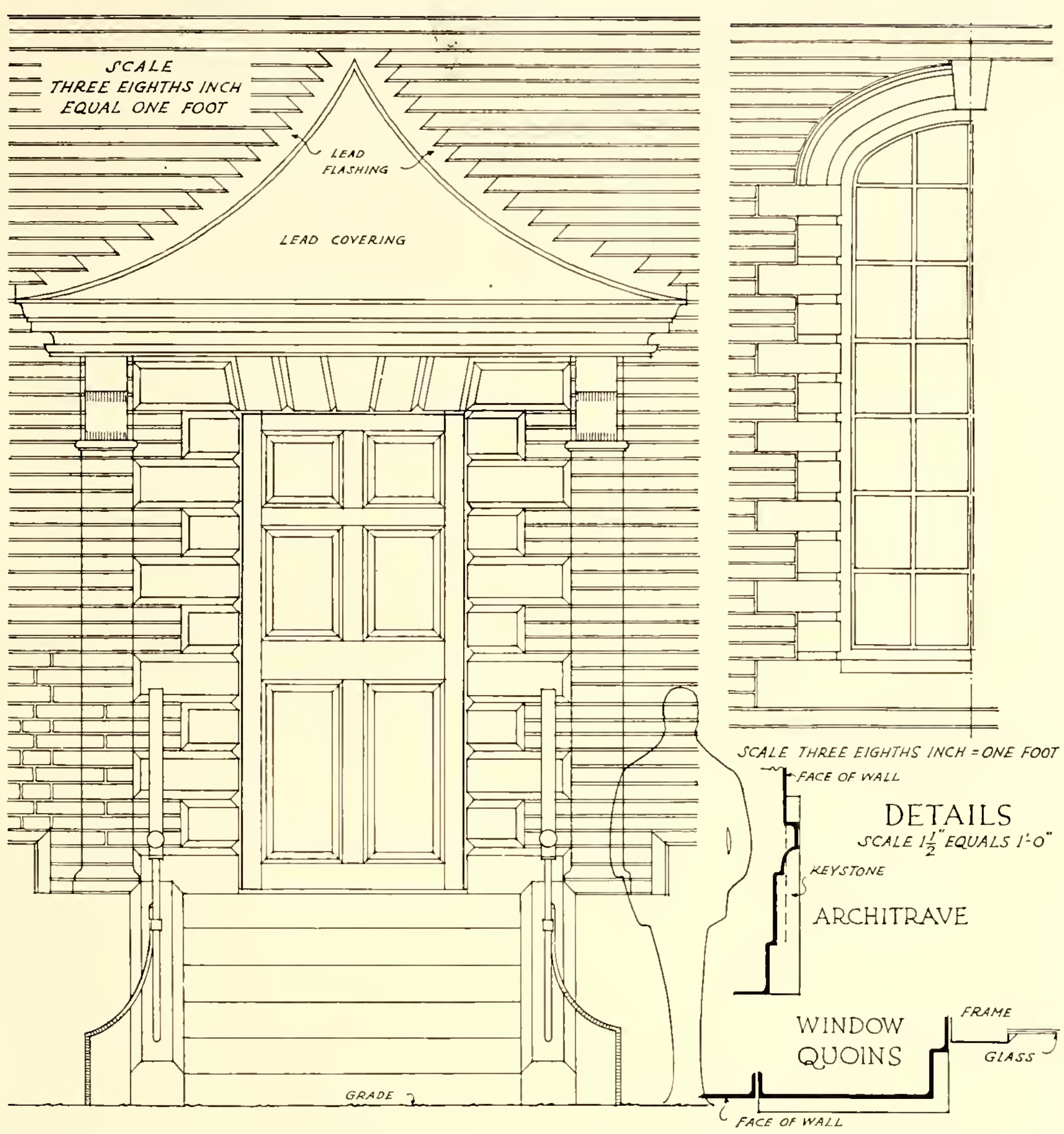
THE name of Sir Christopher Wren is frequently associated with this house. He may not have been its architect, but it at least bears strong evidence of being the work of some member of his school, for it possesses the thoroughly domestic if slightly formal character which distinguishes much of Wren's work. The string course between the windows of the lower and upper floors is of stone, but the quoins are of brick and are laid in a bond different from that used for the body of the walls. The chimneys are massed in a way that gives a note of variety.

This house, called by John Evelyn, who was the owner's friend, a "modern Italian villa" was built upon the site of a much older house, and the ancient moat is still spanned by bridges.



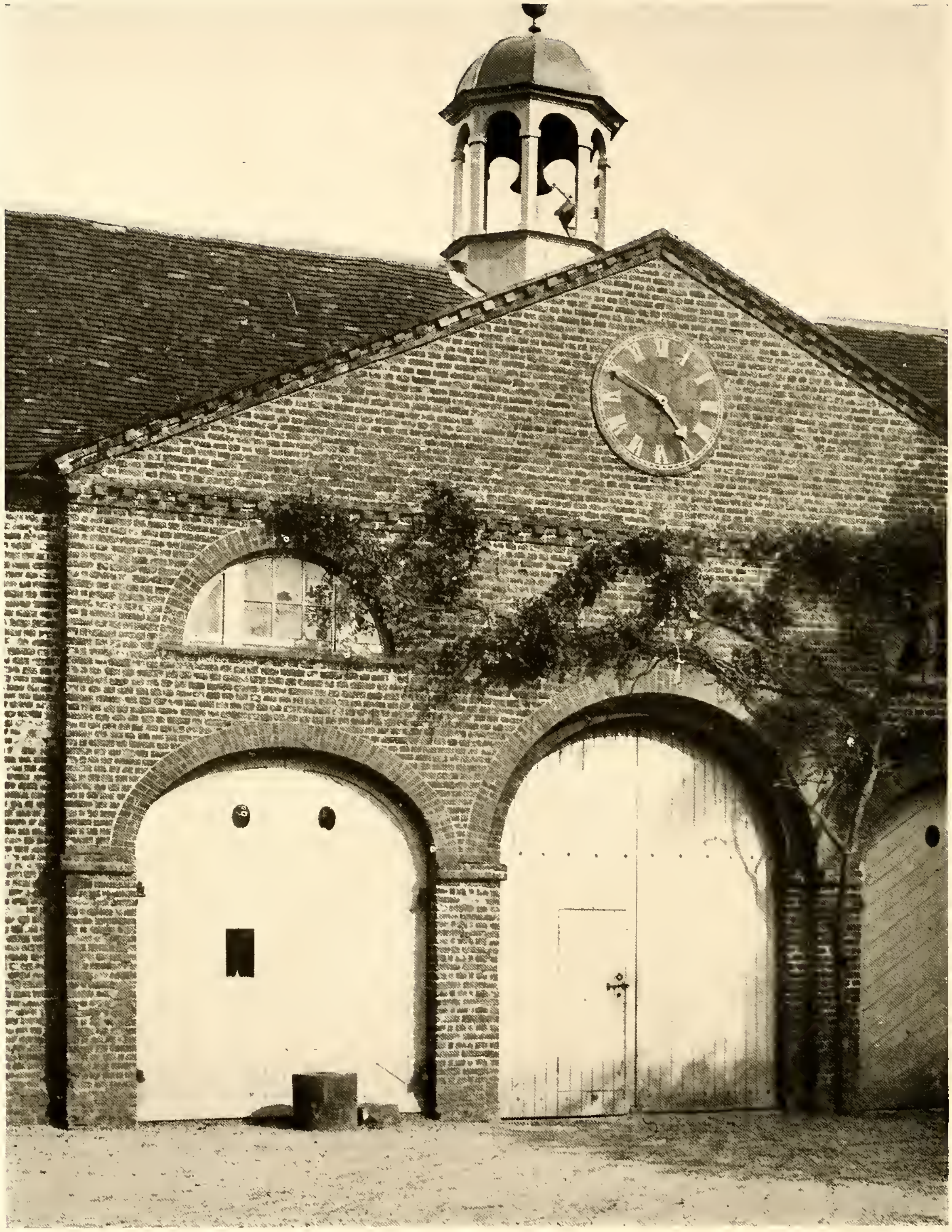
ENTRANCE DOOR, CHOIR HOUSE
AT SALISBURY

This unusual doorway, center feature of the front facade, is bold and masculine in treatment.



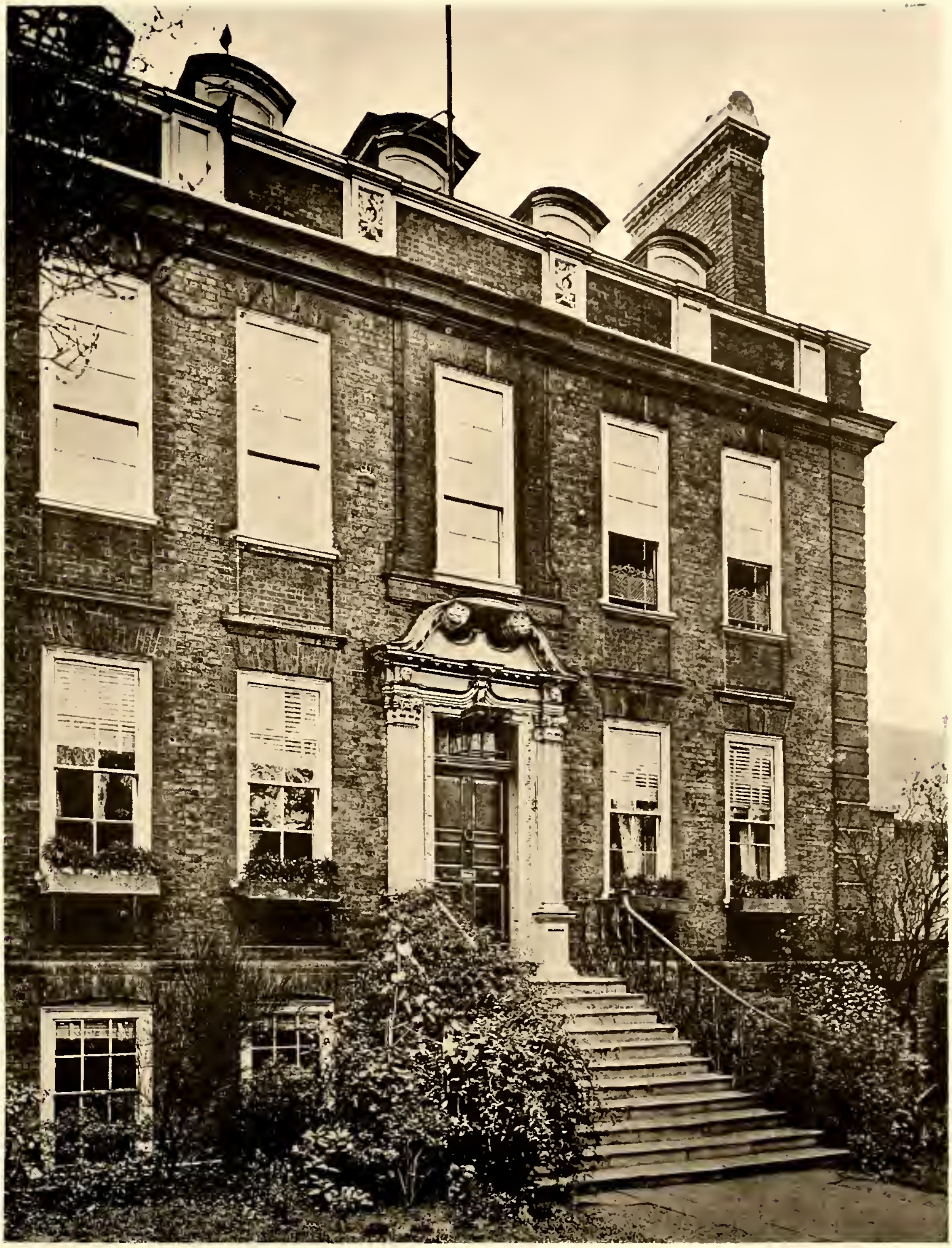
THE CHOIR SCHOOL , SALISBURY

NO building designed by Sir Christopher Wren better shows the thought he gave to even his minor work, than this small structure. Accurate proportions, unusual composition, and care in detail distinguish this dignified design. The elliptical headed windows and the hood which shelters the doorway give emphasis to the entrance. Wren's work frequently shows excellent use of quoins, sometimes of stone but often of brick. In this instance use is made of quoins differing in size at the corners, the door jambs and the windows, giving variety to the facade and emphasis to the openings.



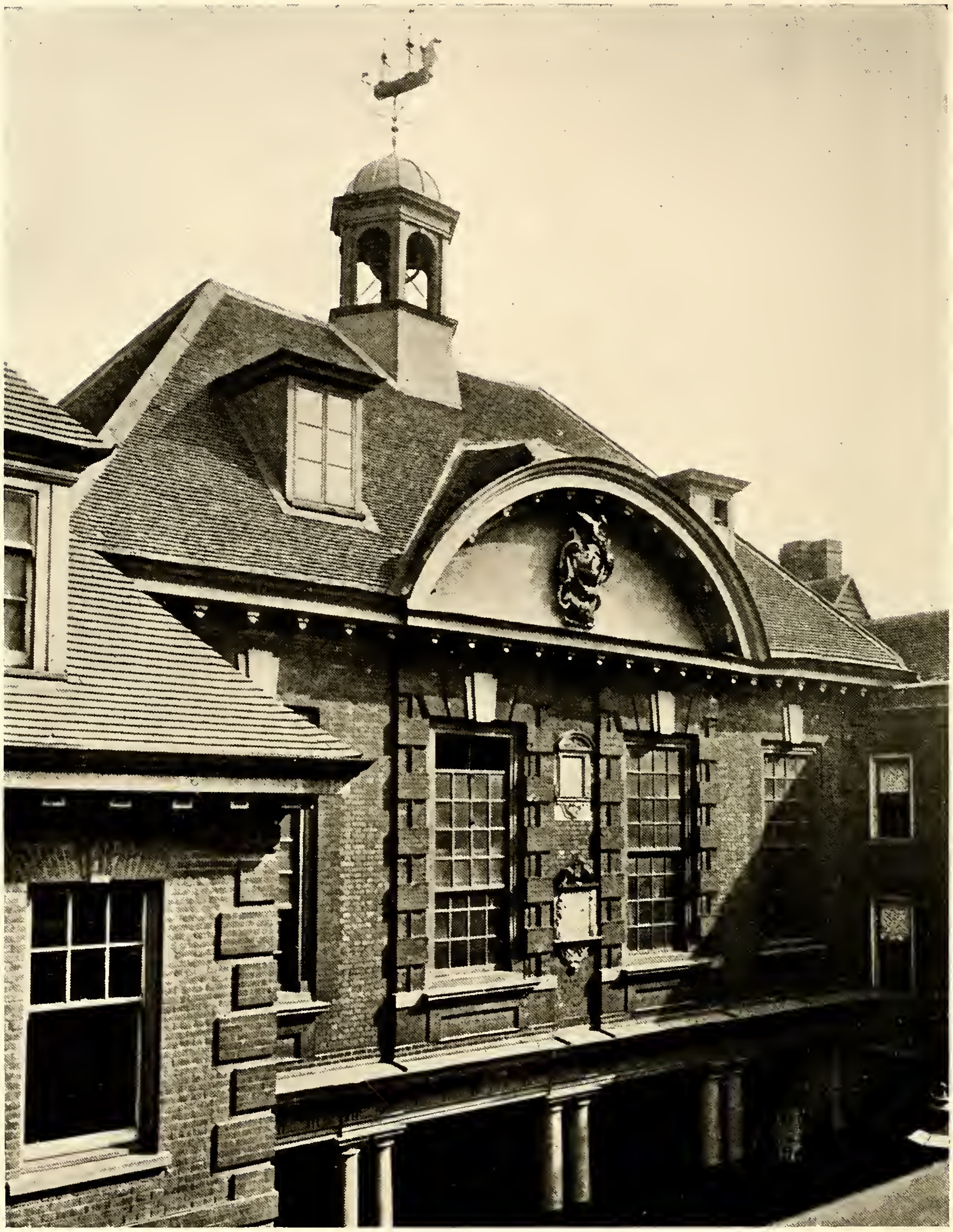
STABLES AT DENHAM PLACE, MIDDLESEX
QUAINT IN PROPORTION AND DETAIL

A simple example of eighteenth century brickwork showing an interesting cornice treatment.



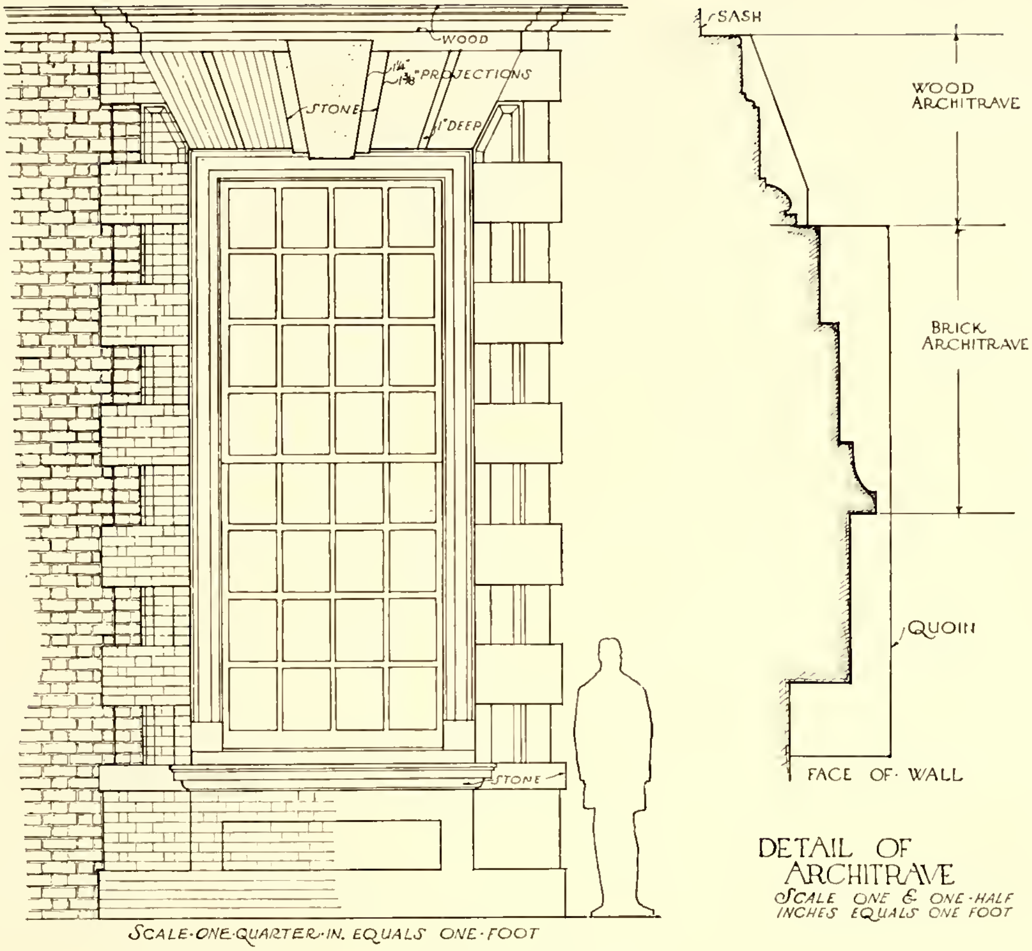
DEAF AND DUMB ASYLUM, CLAPTON, LONDON
A FULLY DEVELOPED GEORGIAN FACADE

The gauged red brick around openings and in cornice contrast with the gray wall brick.



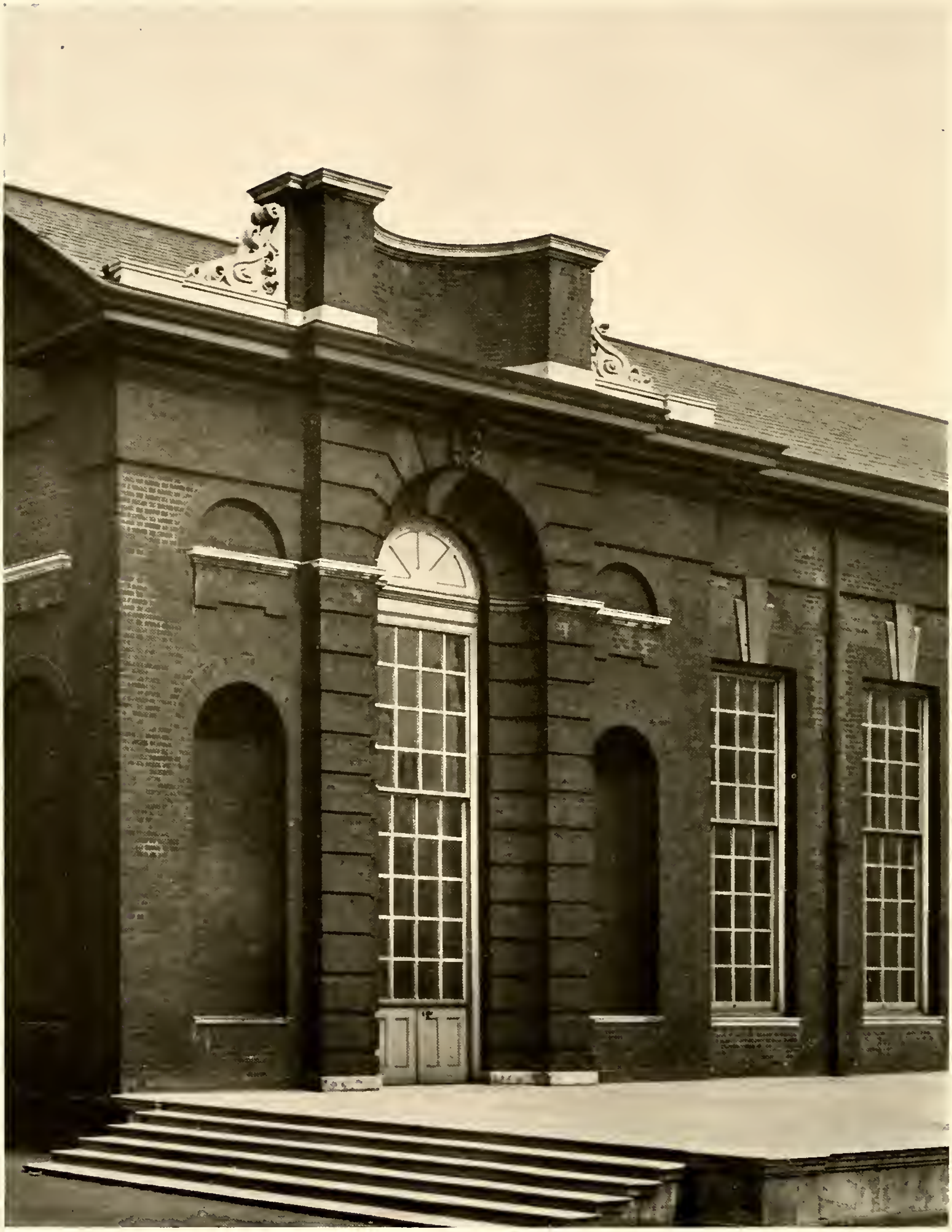
THE GUILDHALL, ROCHESTER
THE WINGS ARE OF MODERN CONSTRUCTION

The window aprons, quoins, and arches show the use of rubbed brick. A rare example of the successful use of two openings as the central motive of a facade.



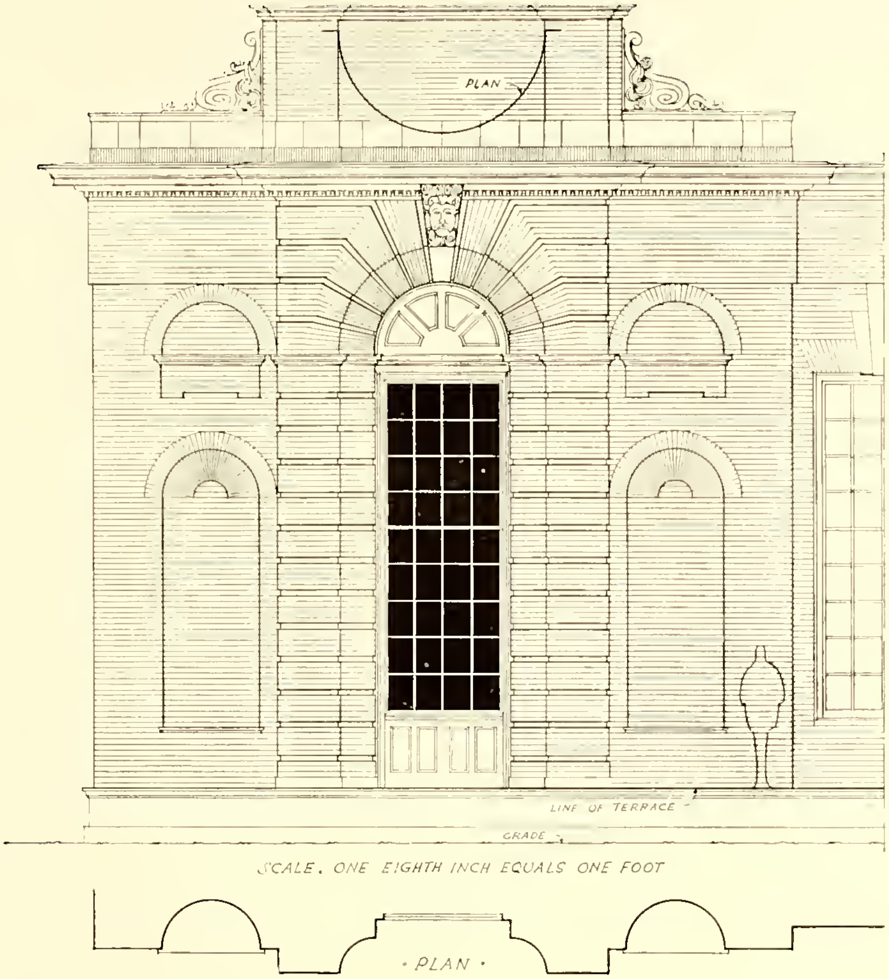
WINDOW · IN · GUILDHALL
ROCHESTER · ENGLAND

THOUGH not by Wren, the Guildhall is in his manner and is attributed to one of his pupils. The colonnade of double Doric columns bears a simply decorated entablature upon which is built what is perhaps one of the finest pieces of Georgian brickwork in England. The central feature is cleverly formed by coupling the two middle windows together with a semicircular pediment, varying the architraves by bold quoins and keystones, and showing a rare example of the successful use of two openings instead of one or three as the central motive of a facade. There is an effective composition around these windows which shows, in interesting contrast with the ordinary surface brick, rusticated quoins, and arches. The cornice and shield in the pediment, which are excellently carved, two dormers, and a hexagonal cupola complete a most effective composition, elaborately embellished, flanked by well balanced wings of later construction. The trim brick is smaller and smoother than the wall brick and the courses do not line through.



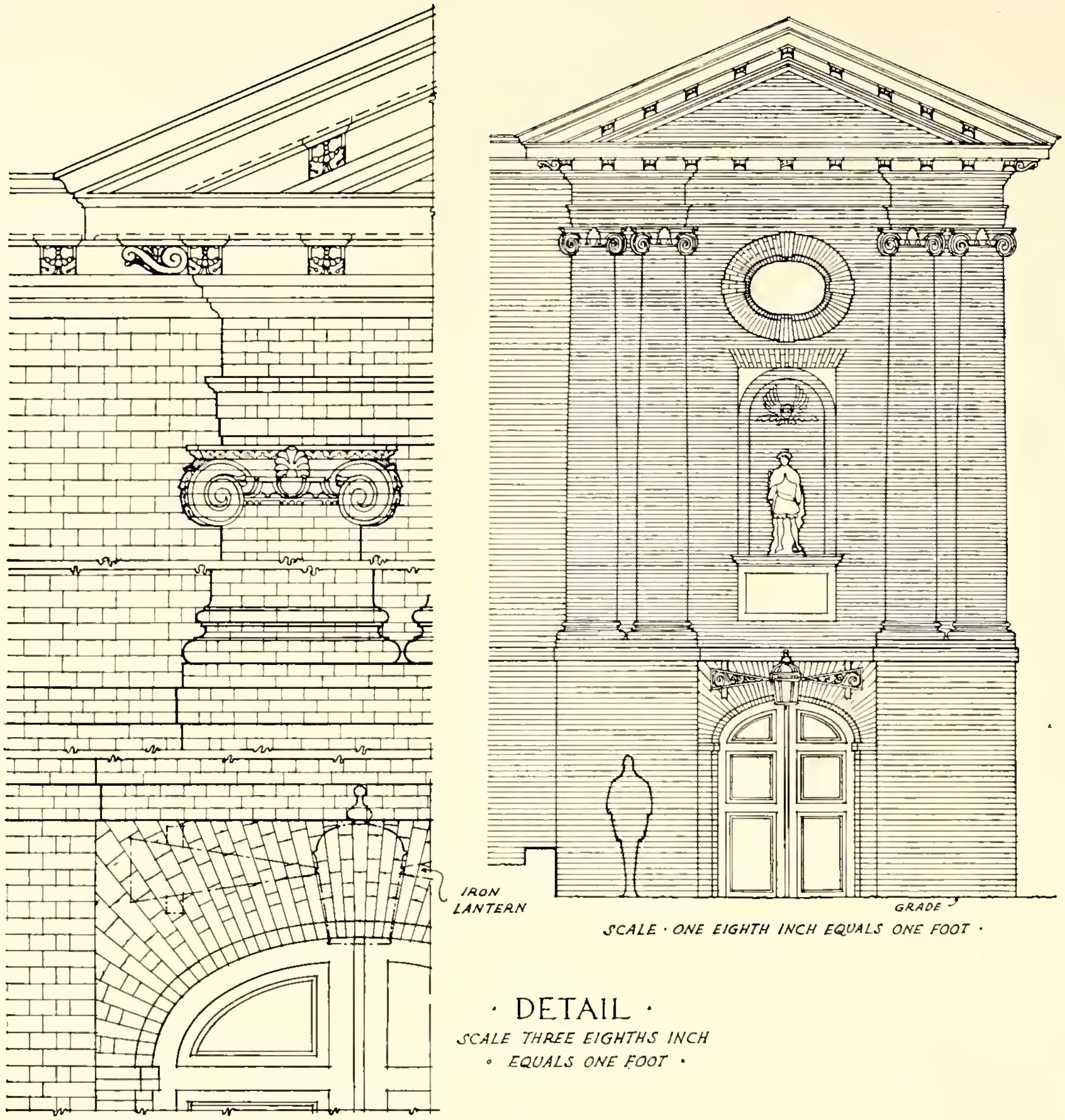
DETAIL OF QUEEN ANNE'S ORANGERY
KENSINGTON PALACE, LONDON

Originally the banqueting hall, built by Wren in 1704. It shows an extensive use of rubbed brick in the niches and coved recessed windows.



END PAVILION, QUEEN ANNE'S ORANGERY
KENSINGTON PALACE, LONDON

BUILT by Wren in the Garden of Kensington Palace for Queen Anne, no finer example exists of his mastery of brick as a medium of architectural expression. All of the important details such as the end bays and the trim of the windows and high arched end doors are executed in red brick, with the plain wall surfaces filled in with pleasantly contrasting yellow brick. In spite of a uniformity of window size throughout the design, no monotony of effect results, as the great length of the facade is pleasingly broken by the end bays and central motive into five balanced parts. No building of the Renaissance period illustrates better the beauty of perfect scale combined with diversity of detail. The end bays hold their proper place in the facade through the preponderance of solid brickwork relieved by the coved windows and niches.

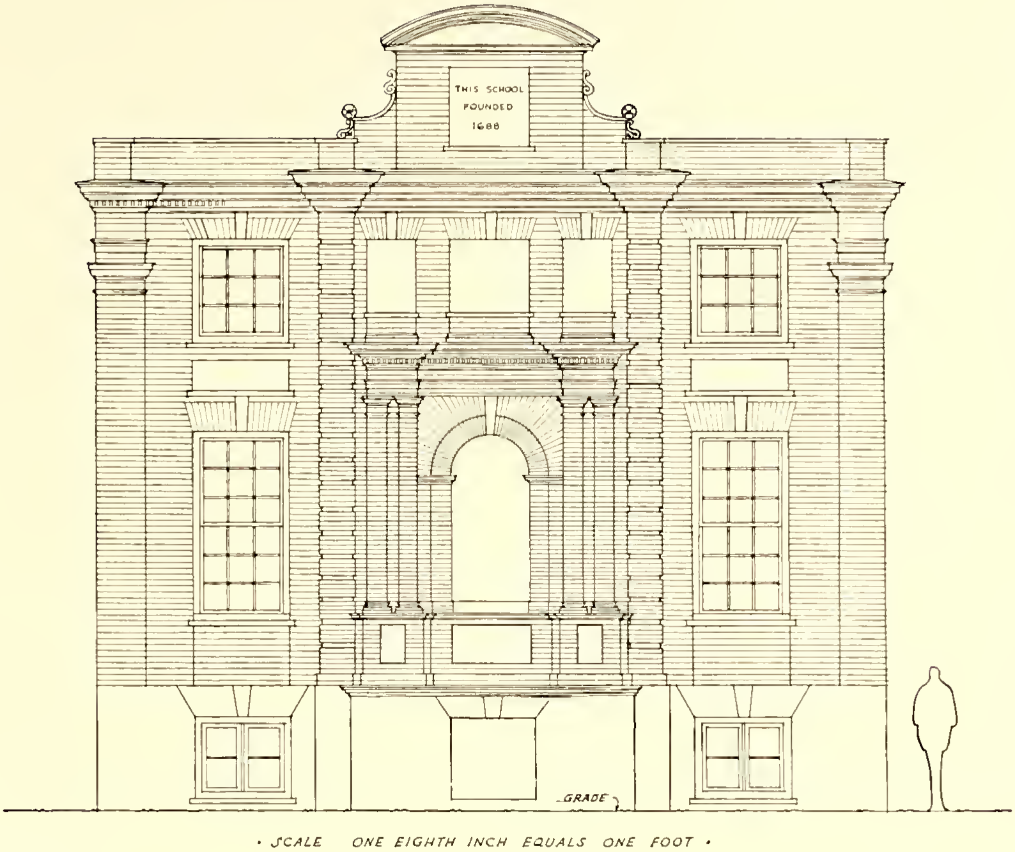


SCALE · ONE EIGHTH INCH EQUALS ONE FOOT ·

· DETAIL ·
SCALE THREE EIGHTHS INCH
· EQUALS ONE FOOT ·

CHRIST HOSPITAL, NEWGATE ST, LONDON

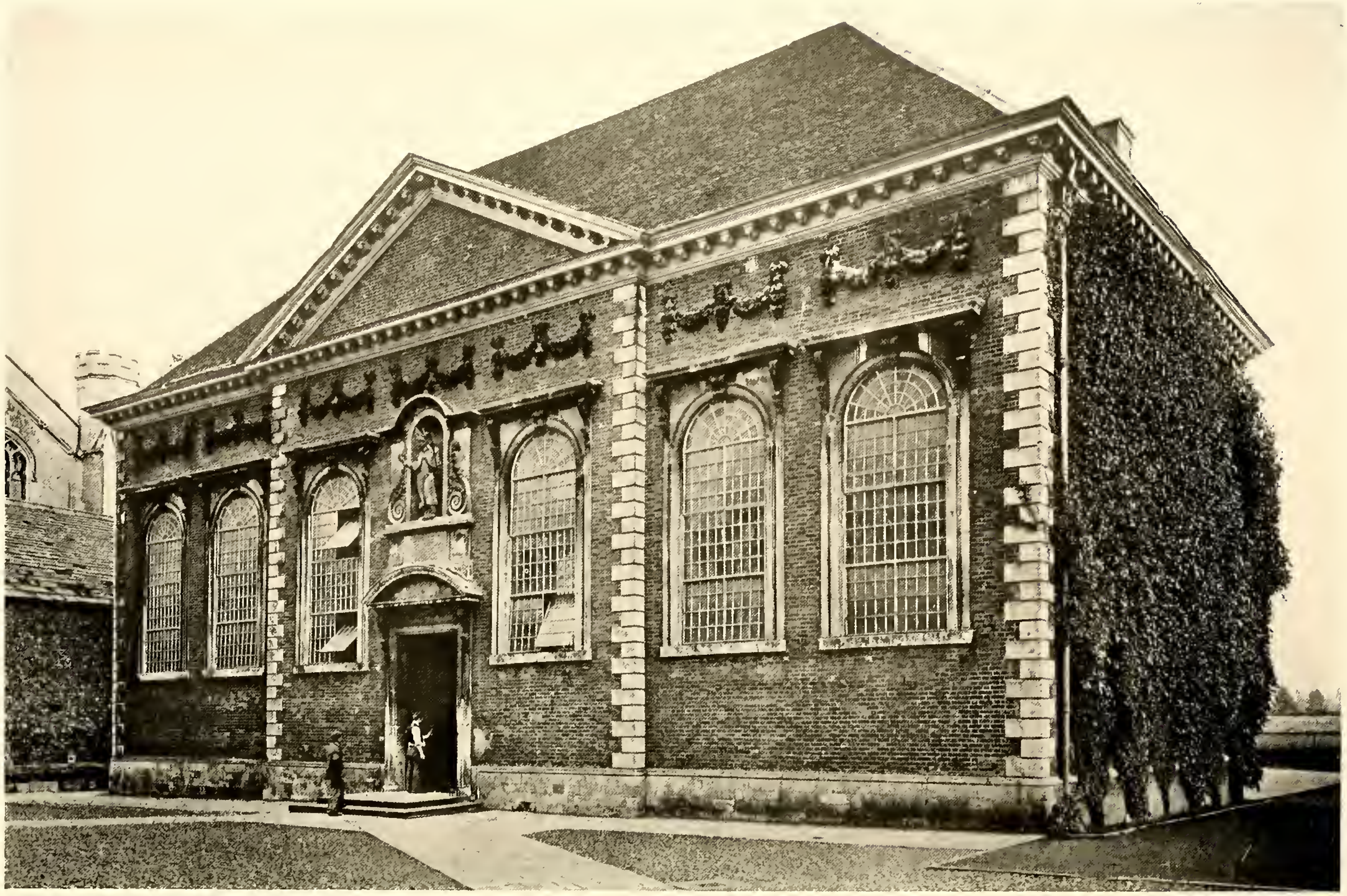
DESTROYED within living memory, Christ's Hospital, built in 1672, was one of Wren's sterner brick designs. Although an unusually long facade, there was no monotony because the length of its ten bays formed by brick pilasters was relieved at each end by a doubling of the pilasters surmounted by classic pediments, and the center of the design was broken by uniting four bays under a large segmental pediment of plain brick. The pilasters and window facings and arches were of smooth red brick, while the wall surfaces were of a coarser, lighter colored brick. The Ionic caps and bases and the broken entablature mouldings above each pilaster were of cut brick. The detail shows an end bay.



BLUE COAT SCHOOL , WESTMINSTER

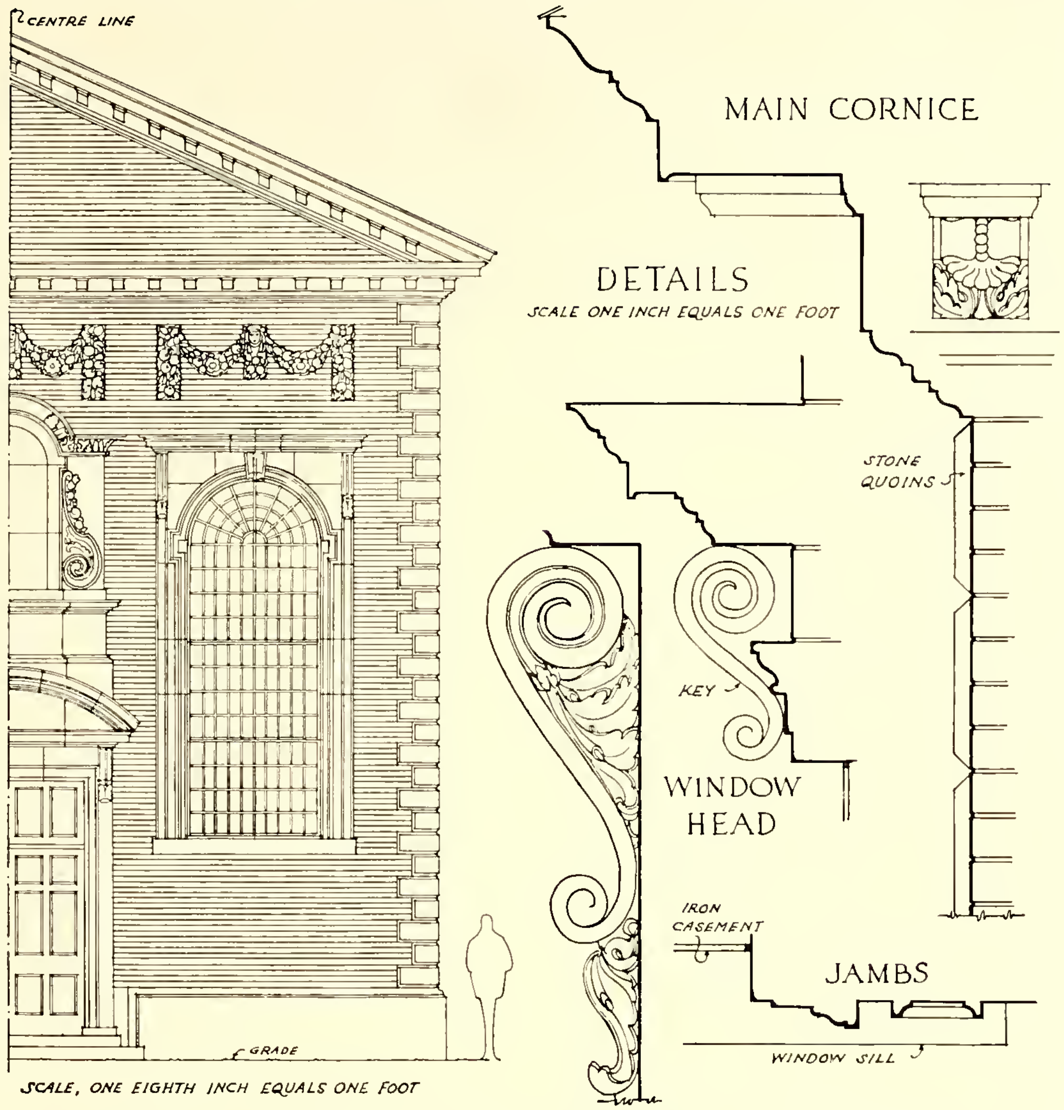
ANOTHER good example of brick architecture is the Bluecoat School built at Westminster in 1688 which is attributed to Wren who may have been assisted in the work by Hawksmoore, judging by certain characteristics of the design. Among the many features which made this building distinctive, is the different architectural treatment of each elevation, the only similarity being in the fact that each facade shows a design in three parts, the center motif in each case being different. The corner pilasters, superimposed windows, and quoined piers, determining the center motif of the above elevation, all tend to relieve the horizontal effect and the lowness of the building. A more complete and consistent use of brick in architectural design has seldom been known and proves beyond all doubt that no other than a master mind conceived it.

Proportion which has been the first consideration, has been achieved in various ways, notably by change of material and care taken in the size and shape of the fenestrations in relation to the wall surfaces.



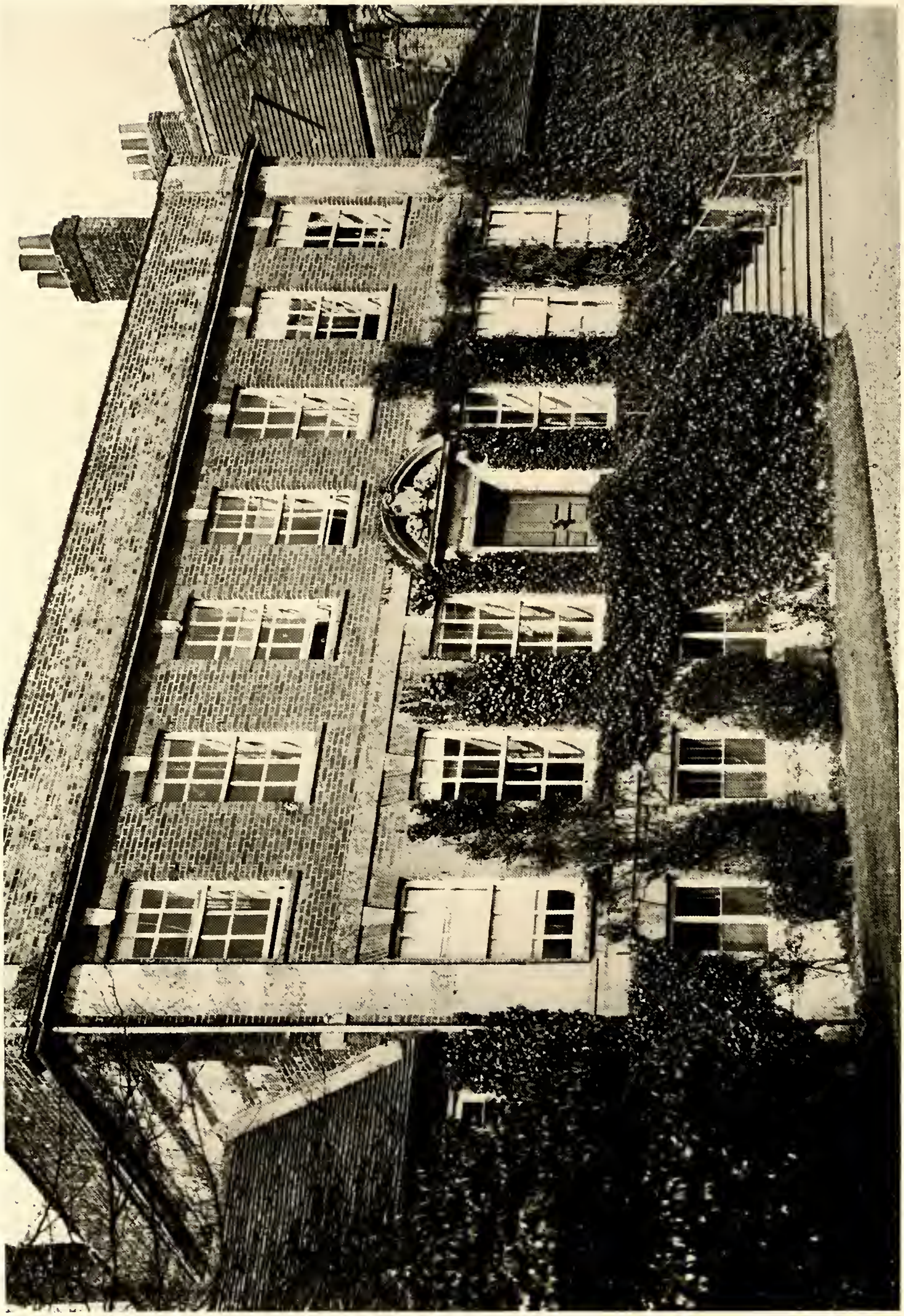
GREAT HALL, WINCHESTER SCHOOL
WINCHESTER, HANTS

Winchester School is one of the maturest of Wren's buildings. "Everything of definitely foreign origin is strained out, and the mellow flavor is racy of the soil."



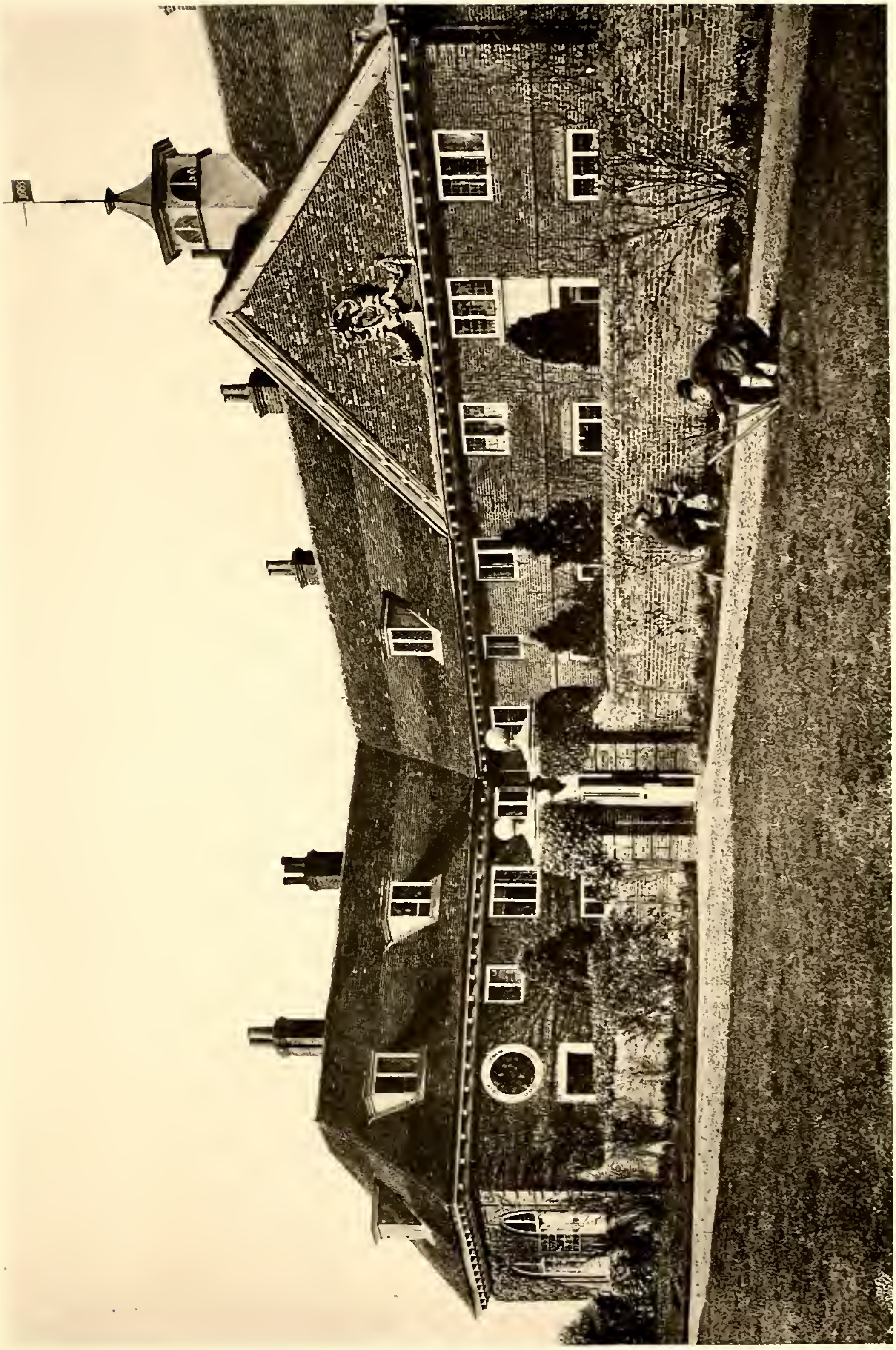
GREAT HALL, WINCHESTER SCHOOL
WINCHESTER, HANTS

THE grace and distinction which Sir Christopher Wren bestowed upon even his minor work are exemplified in this little building. In its absolute symmetry, the richness of the color of its brickwork and the restraint with which ornament is used, it affords an object lesson in days when the tendency is toward clumsiness of design and over-decoration. The building would have been merely a box had not the facade been made to break slightly with the pediment, thus making possible the accentuating of height by the stone quoins at the sides of the central motive of entrance door and large flanking windows, terminating above the cornice in a simple brick filled pediment of good proportion. Carved stone consols, swags, and niche ornamentation enrich the facade of the building.



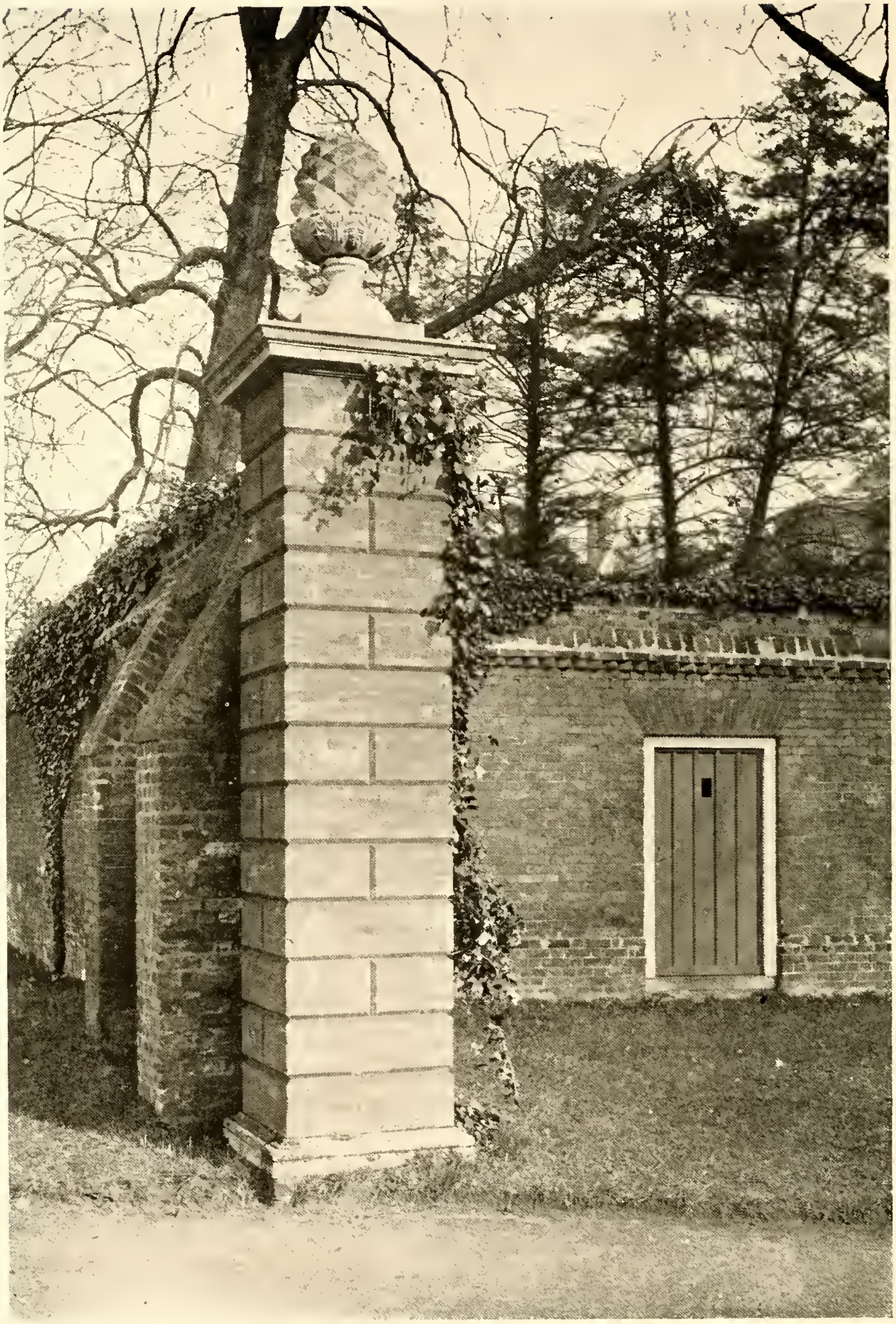
A HOUSE IN THE CATHEDRAL CLOSE
SALISBURY, WILTS

This front displays a fine sense of proportion and the right use of an ornate doorway as a focus of interest in the plain wall.



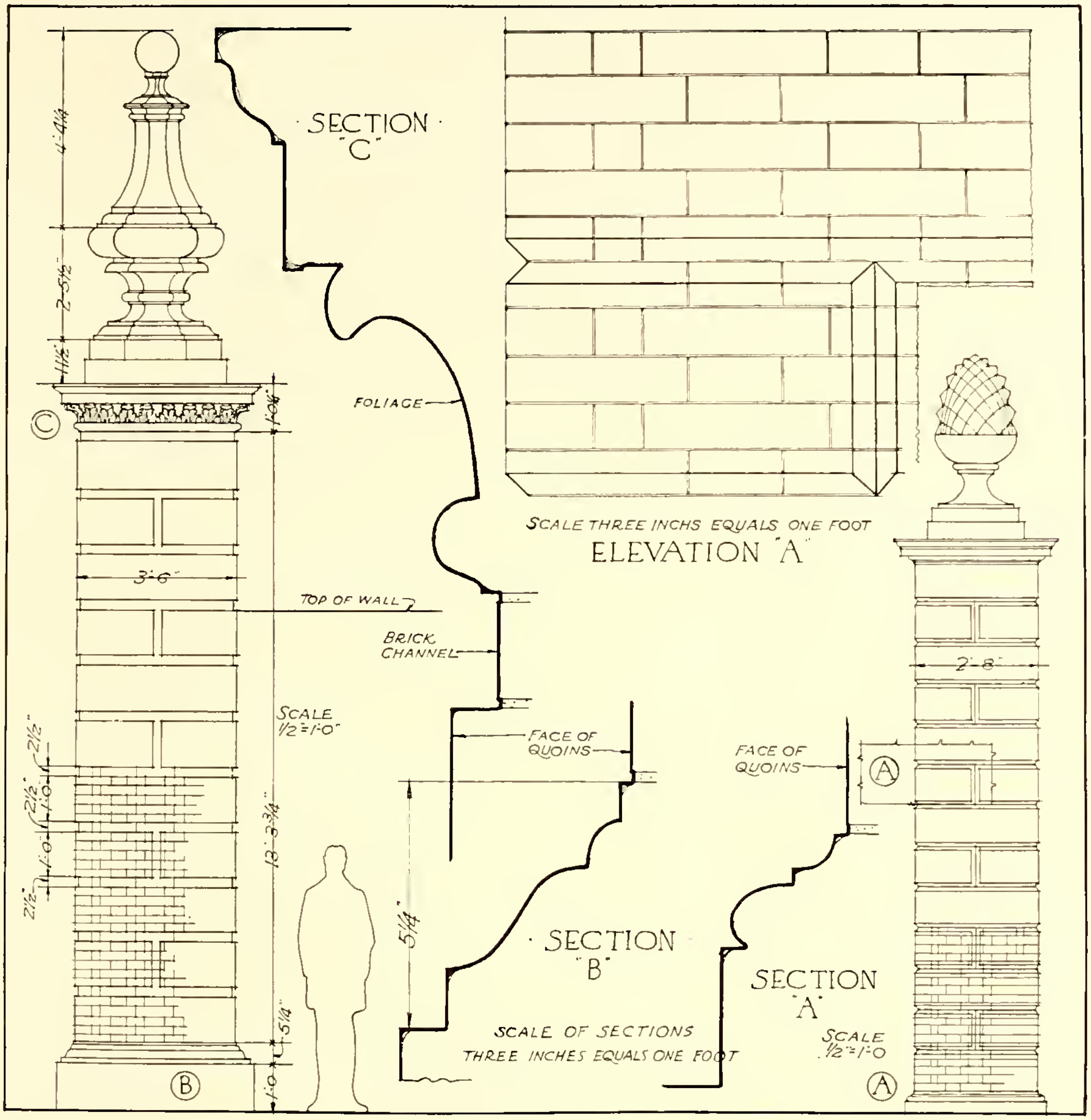
THE LUCAS ASYLUM, WOKINGHAM, BERKS
ONE OF MANY FINE BRICK ALMSHOUSES IN ENGLAND

Excellent brick masses in a building of the time of Queen Anne
The brick quoins and belt courses are typical of the period.

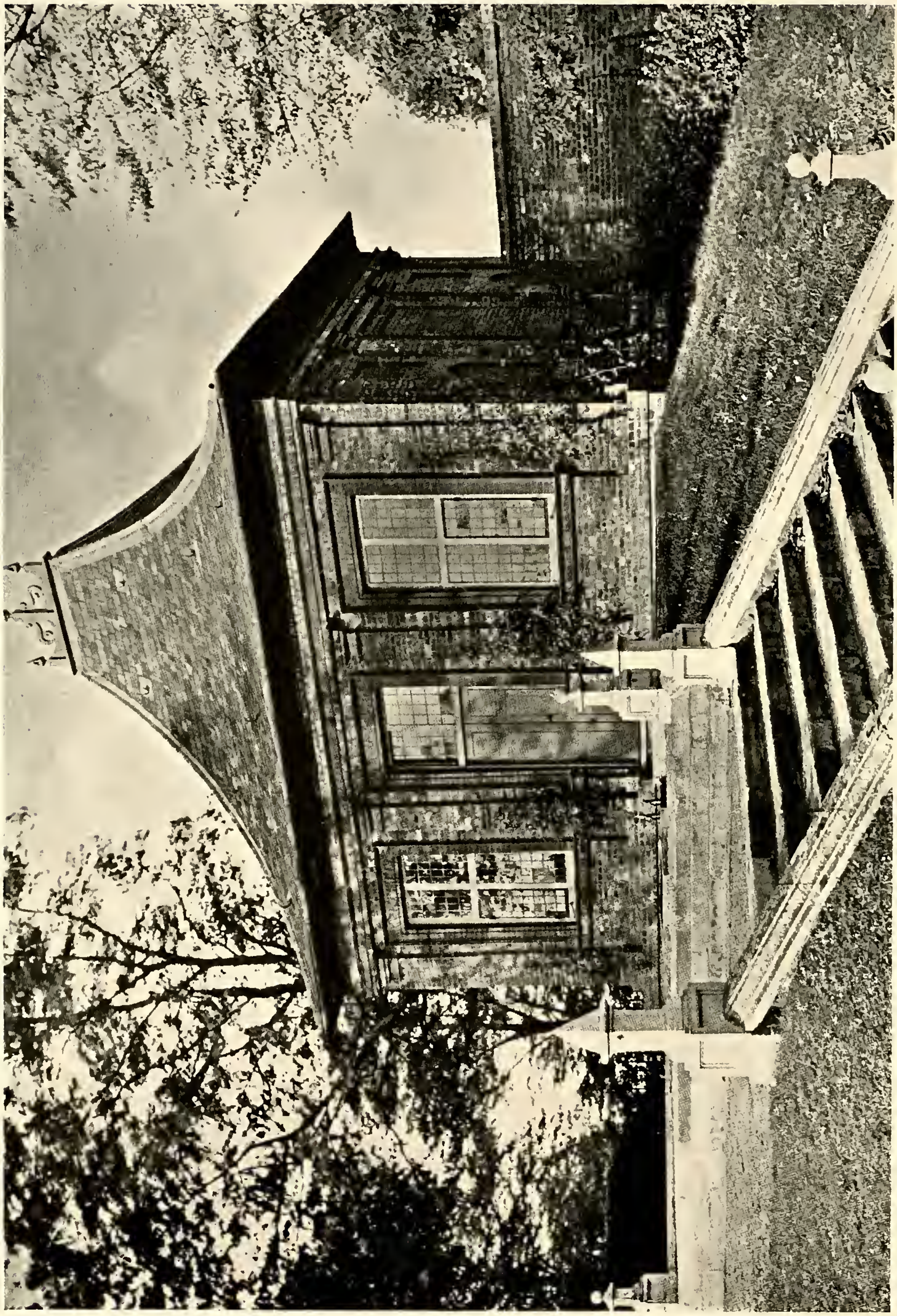


GARDEN WALL PIER
HAM HOUSE, SURREY

Built about 1780, of "glowing" red rubbers with V-shaped rustication carefully chiseled out.

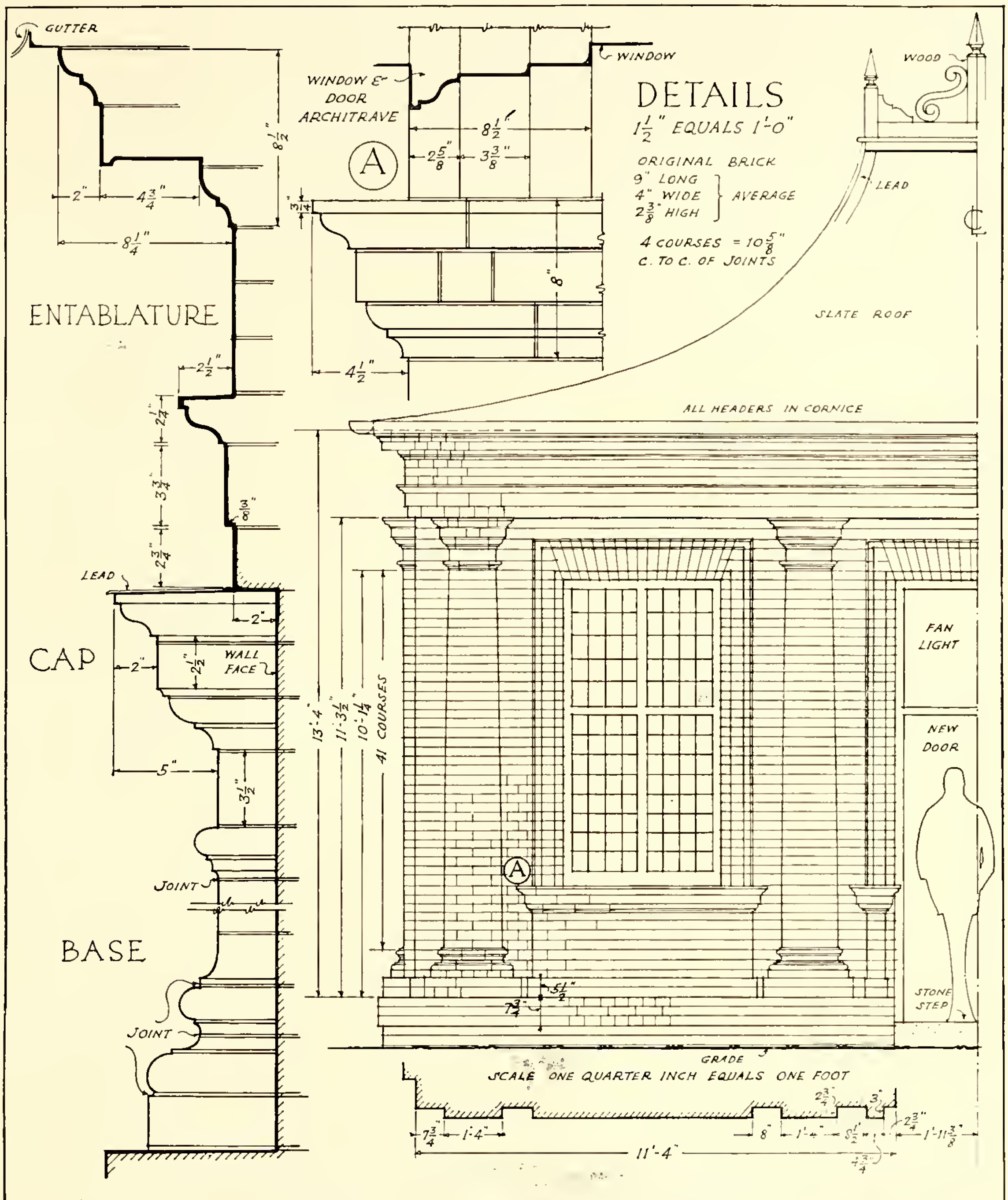


THE details to be observed in eighteenth century English brickwork are derived from the Italian Renaissance,—not alway directly, and in fact in most cases by way of Holland. Tempered also with the hand of the English workman, they exhibit an individual quality that always marks them as English. These gate piers are illustrative of the transition. The design of the larger which is at the entrance to Lincoln's Inn Fields, is attributed to Inigo Jones; the smaller which is at the end of the garden wall, Ham House, Surrey, and of later date, is typical of many found on English estates. In one case the channeling is formed by setting back one course of bricks an inch, and in the other the V-shaped rustication is chiseled out after the brick is laid up. In the detail of brick quoins and rustication in English brickwork it is noted that the channels never exceed one inch in depth and seldom more than one brick course in height. Caps with mouldings and ornamental finials were usually of stone, sometimes carved.



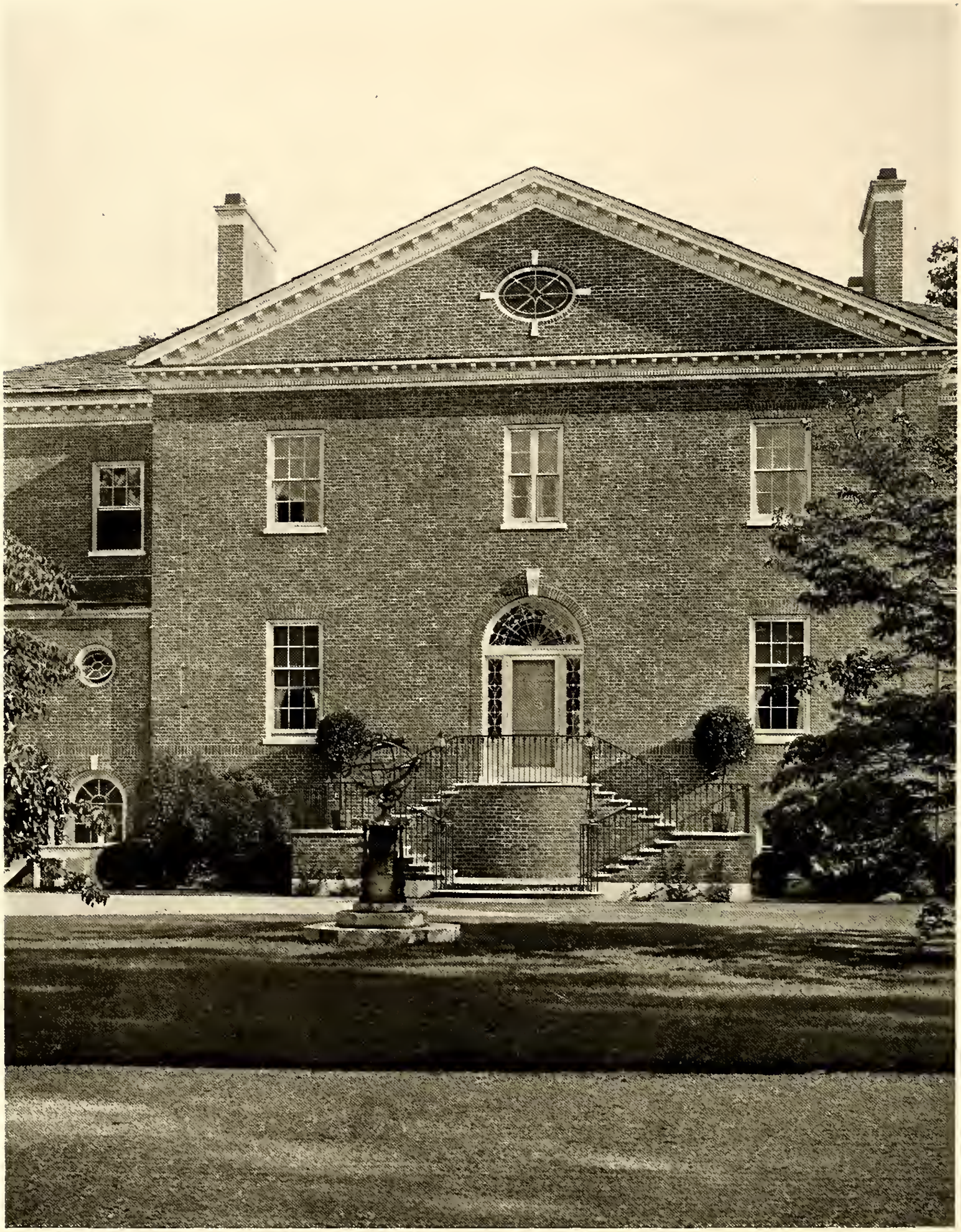
GARDEN HOUSE
CHARLTON HOUSE, WILTS

No stone trimmings used here. Window trim and aprons, cornice mouldings, pilaster caps, and side wall panels all show remarkable delicacy for details executed in rubbed brick.



GARDEN HOUSE, CHARLTON HOUSE, WILTS.

As this little building is much in Inigo Jones' manner, it seems more than likely that he supplied the design which closely resembles the buildings at Becket Park, Berkshire. Although small it is of excellent proportions, a model of reserve and dignity.



DETAIL OF ENTRANCE FRONT
HOUSE OF JAMES I. BURDEN, ESQ., LONG ISLAND
DELANO & ALDRICH, ARCHITECTS

The dignity of a plain brick wall as a background for a beautiful Georgian doorway and ornamental approach is here perfectly exemplified.

American Brickwork

AMERICA is not lacking in traditions of good brick architecture; the English and Dutch colonists brought with them the principles of brick building generally practiced in the home countries and, after the strenuous days of pioneering had been passed and wealth came to the colonies, brick kilns were set up in districts abounding with clay, and substantial houses, small and modest to be sure but embodying the character of Georgian architecture, were built in many scattered localities. The Atlantic seaboard contained the whole activity of the country and, with its supervision in English hands, it was subject to uniform English influence. At this time the style of Wren was firmly established in England, and in America it was echoed in church spires, doorways, and interior woodwork in which the favorite post-renaissance motifs of broken pediments, consoles, and rich carving were in wide evidence. Brick was the favored material whenever the purse of the owner allowed, and we have remaining today such splendid examples of his good taste and appreciation of fine building as Westover, Homewood, and Monticello.

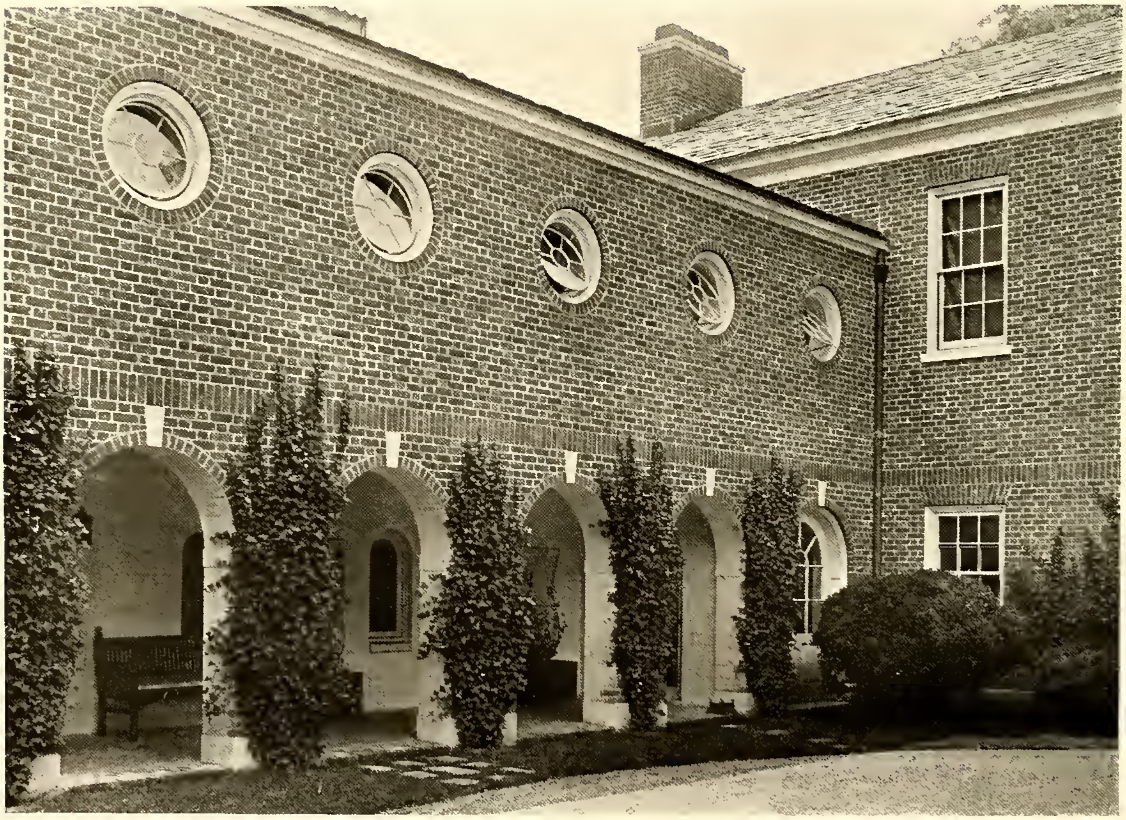
With our own traditions going back to English roots, it is but natural that American architects should study the originals from which our colonial inspirations were derived. The Tudor and Georgian forms as found in England are richer in detail and more fully developed than their early American counterparts, but the beauty and character that permeate much of American brickwork of the last decade or two are due to the emulation of standards established long ago in England.

With the many varieties of brick available today that are not always used wisely, and the temptation that exists, due to an appreciation of old work, to affect the exact appearance of brickwork that has become aged through centuries of exposure to the weather, it may be permissible to recount the salient features of good brickwork that are manifest in the work being done today by the most skillful American architects, as shown in the accompanying illustrations.

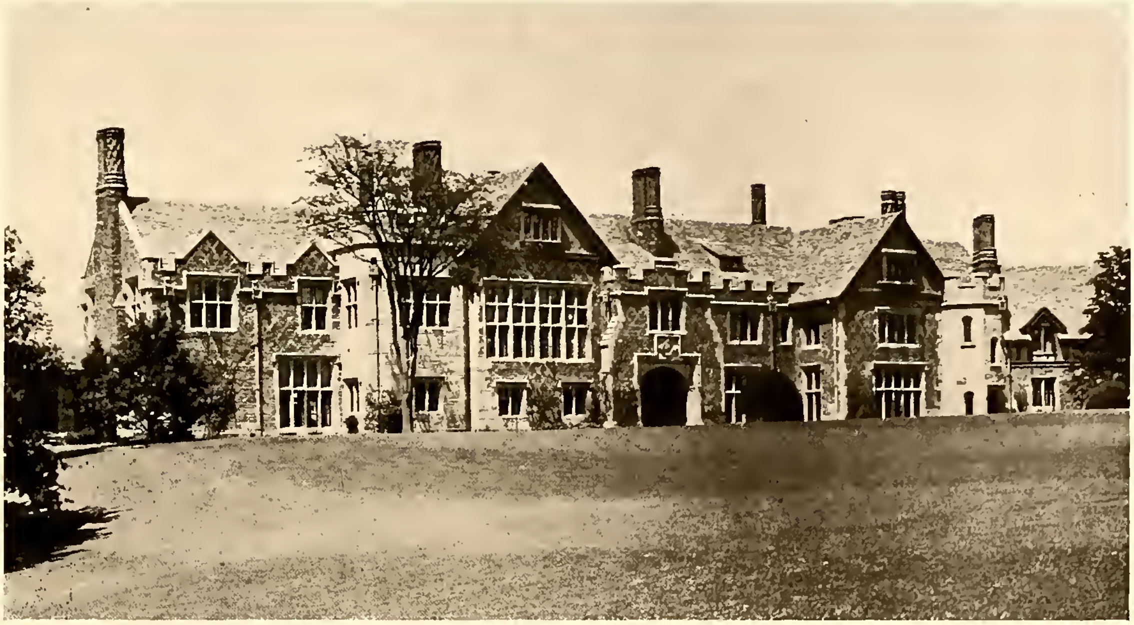
The artistic value of brick surfaces is in their texture and color. Texture produces tone, first, by the joints, second, by the surfaces of the individual bricks. The most artistic brick wall displays slight irregularities in tone; just as a marble mosaic in which the pieces and joints vary is lively and full of character, so the finer brick wall will be that in which the individual bricks have slight unevenness of texture and the shade of one brick is not identical with that of its fellows. The brick with a granualar and rougher surface, while moderately true in shape, offers a more striking and diversified texture than the finer varieties, and is therefore more fitting in certain types of wall; but the finer brick also has its appropriate uses where the design or character of the work demands a more formal treatment.

Recessed panels may be disturbing in effect when they interrupt the delightful play of light and color upon unbroken surfaces of brickwork. Spotting or contrasting material, such as inserts of stone, keystones, and voussoirs should be avoided if solidity and dignity of design are to be of paramount consideration in the desired effect.

While these contrasts give certain piquancy to the design, they are out of scale with the texture of the brick surfaces and detract from the dignity of the general mass. Brickwork is essentially a mosaic with the horizontal joints dominant. Its scale is set out by the patterns used, but chiefly by the size of the units and it is a mistake to insert into a mosaic a unit of much larger scale and of different tone without providing a



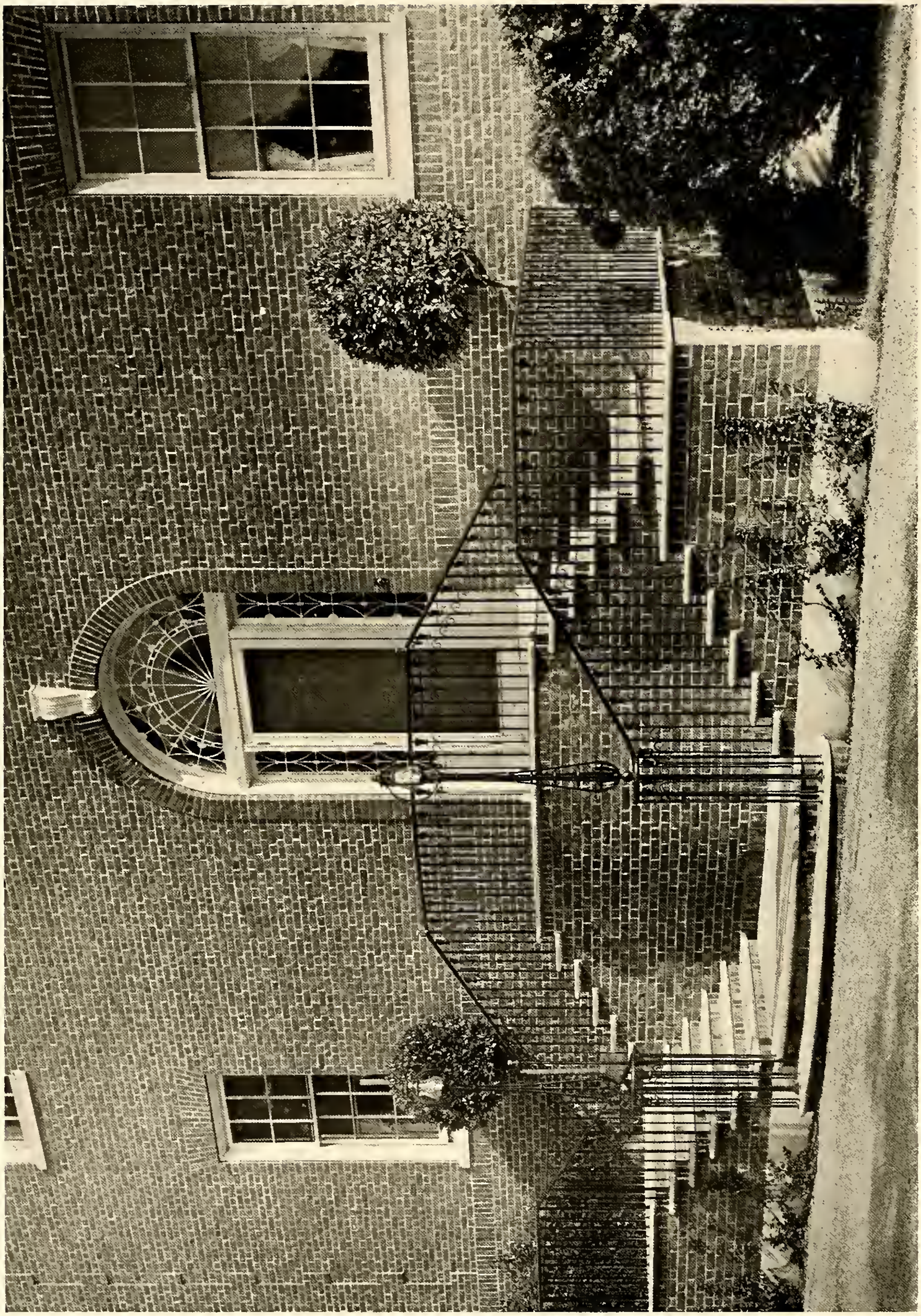
The long wing of the Burden House shows a perfect example of balanced design carried out in a brick wall unadorned with projecting or decorative features



Tudor House at Newport, built for Stuart Duncan, Esq., by John Russell Pope, Architect, in which Comptom Wynyates was taken as the precedent

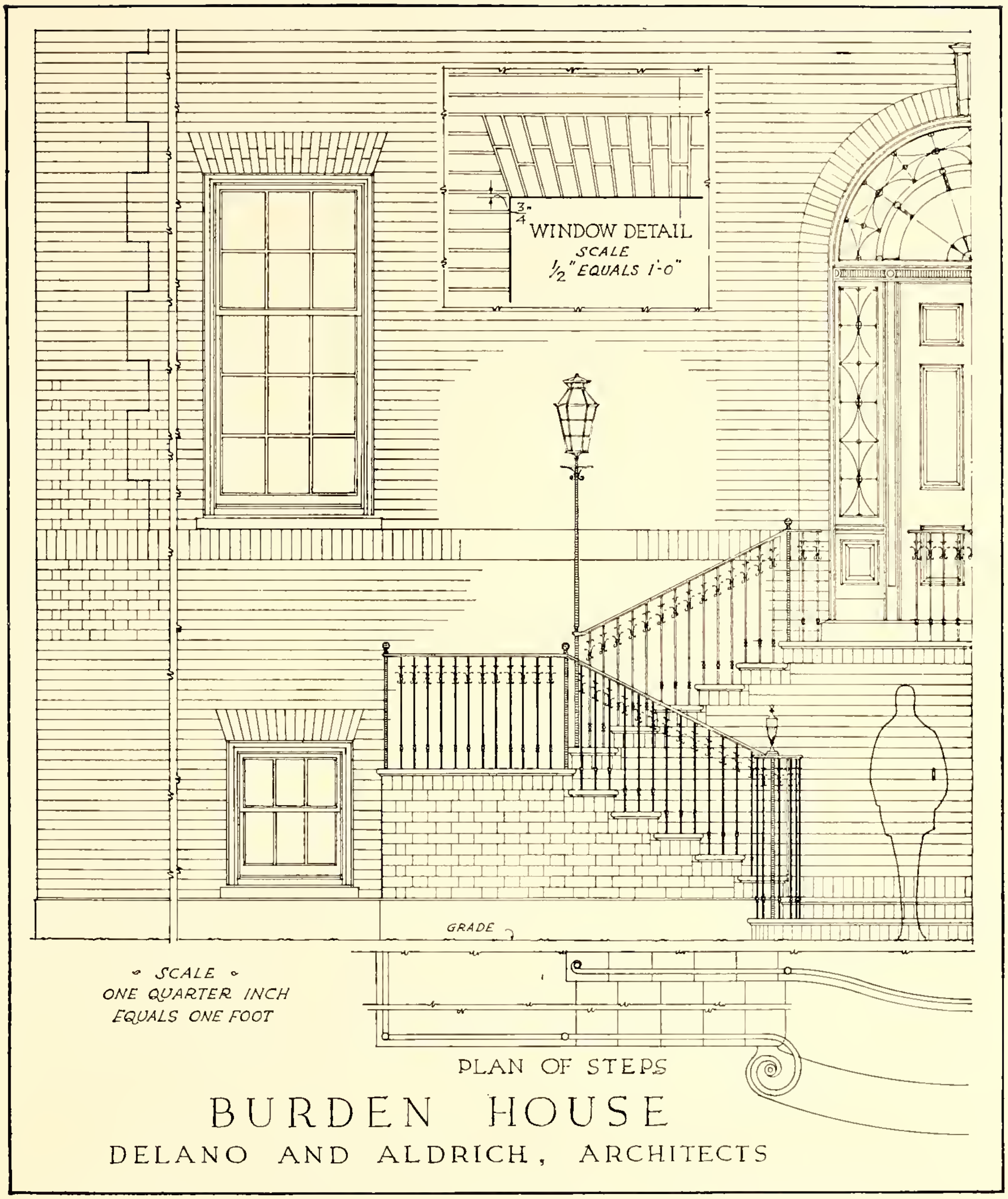
gradual approach to it from the brick surface by intermediate detail. The sudden transition from brick texture to isolated stone keystones is staccato in its effect and should be used with discrimination. An excellent example of its proper effect is seen in the Burden house. Used to any greater degree, the facade becomes uneasy from lack of general tone and of broad, uninterrupted spaces in the brick wall surface.

Following the revival of brick building, in which the actual nature and merits of the material were recognized, it was natural that exaggeration should creep in; if a little roughness and irregularity were a good thing, some believed that more would be better, and we accordingly see examples where the refuse of kilns has been picked over to select the most mis-shapen and distorted bricks, with the result that the completed wall seems affectedly grotesque to anyone of sound taste. Brickwork should be a product of artistic design and skilled craftsmanship which the wall should fittingly express, but to abandon the traditions of craftsmanship in search of the bizarre under the name of the picturesque or the antique is debasing a good material and laying architectural sincerity open to question. Fortunately this tendency is disappearing, and there looms ahead an era of architectural development in brick that will not only compare favorably with any traditional period of the past in matters of design, but far exceed it in rich color harmonies of wall surface, if the material available is artistically handled in harmony with its fundamental character.



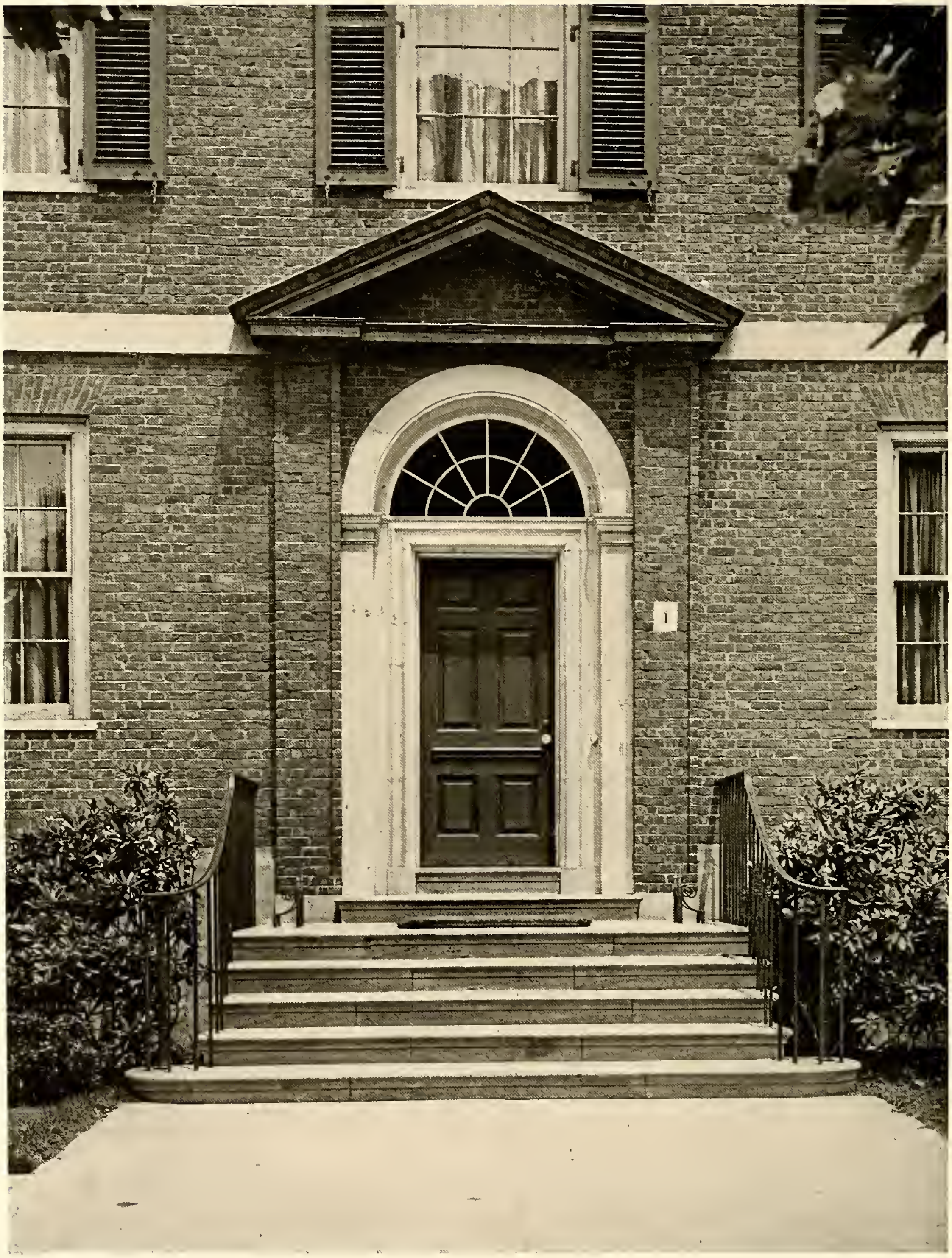
ENTRANCE DETAIL
HOUSE OF JAMES I. BURDEN, ESQ., LONG ISLAND, N.Y.
DELANO & ALDRICH, ARCHITECTS

The delicate detail of this door and the railings of its steps is in delightful contrast to the broad mass of plain brick walls.



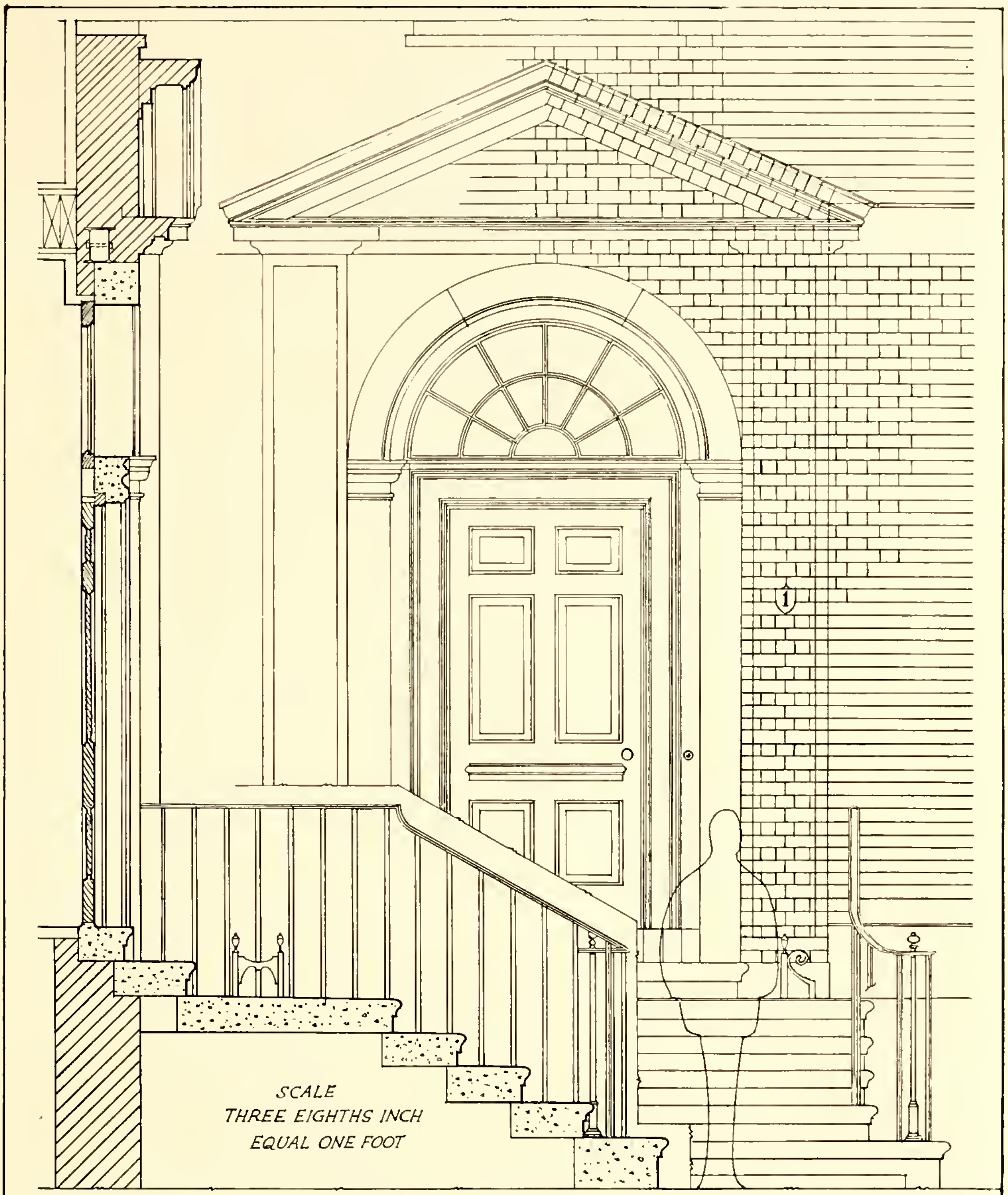
BURDEN HOUSE
DELANO AND ALDRICH, ARCHITECTS

MODERN American brickwork offers no finer example than the Burden house. Using Flemish bond throughout with no attempt at patterning, the brick walls show a wonderful surface texture and color. The very low relief of the corner quoins and the trim around the entrance door serve to emphasize the simplicity of the plain wall. Against this background the white trim of the main door and windows, as well as the delicate hand rail and lantern posts stand out in striking but pleasing contrast.



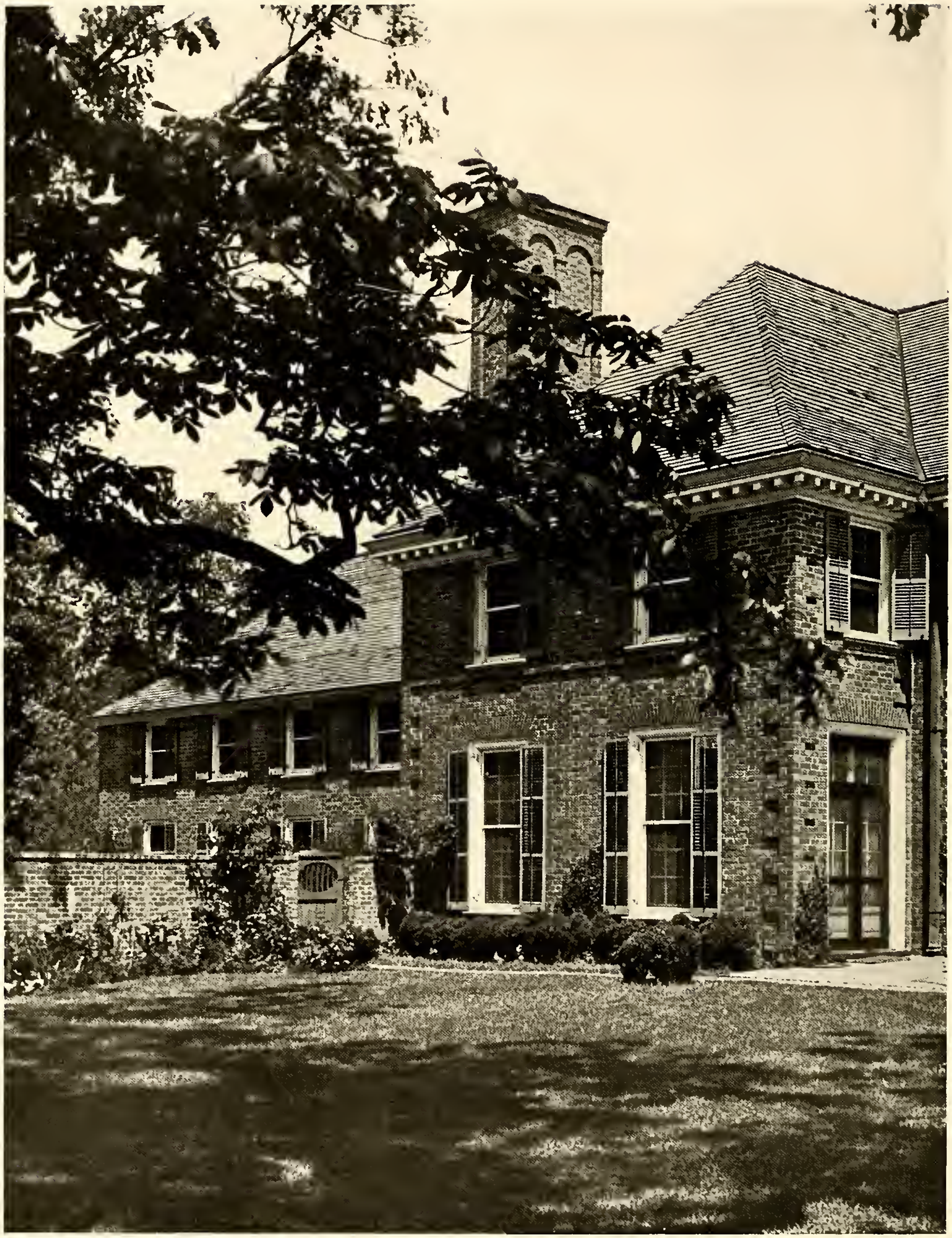
ENTRANCE TO HOUSE OF MRS. W. K. VANDERBILT
SUTTON PLACE, NEW YORK
MOTT B. SCHMIDT, ARCHITECT

The panelled pilasters and delicate mouldings of the cornice and pediment in moulded brick show great refinement and skill in handling.



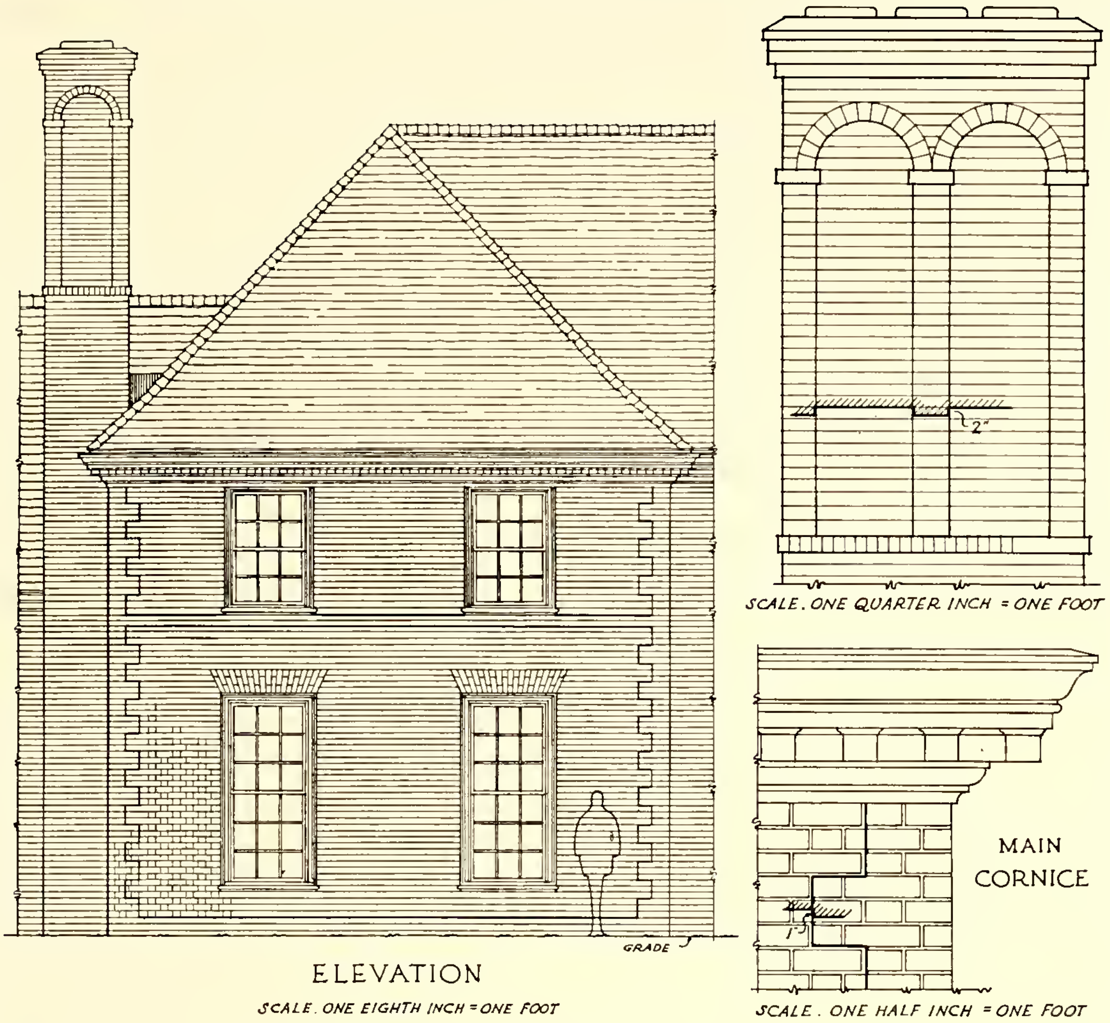
VANDERBILT HOUSE, SUTTON PLACE NEW YORK CITY
MOTT B. SCHMIDT, ARCHITECT

IN this beautifully proportioned and detailed doorway adapted from the entrance to No. 2 King's Bench Walk, Temple, London, is found a perfect example of the adaptability of English precedent as developed by Wren and others for modern architecture.



DETAIL OF GARDEN FRONT
HOUSE OF ALONZO POTTER, ESQ., LONG ISLAND, N.Y.
PEABODY, WILSON & BROWN, ARCHITECTS

Quoins and string course in strong relief together with flat window arches, all in brick, give pleasing contrast to otherwise flat walls.



ELEVATION

SCALE. ONE EIGHTH INCH = ONE FOOT

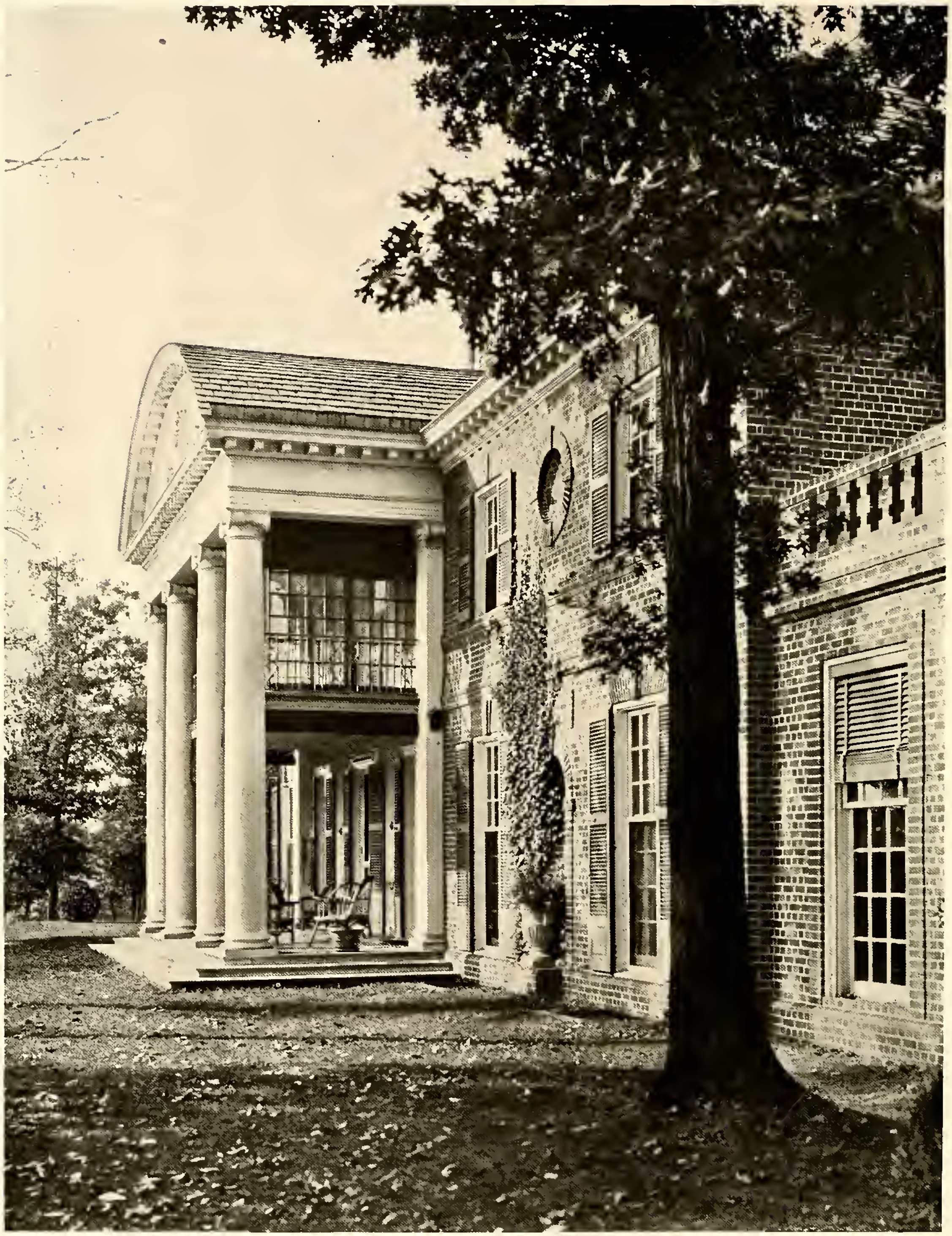
SCALE. ONE QUARTER INCH = ONE FOOT

SCALE. ONE HALF INCH = ONE FOOT

POTTER HOUSE

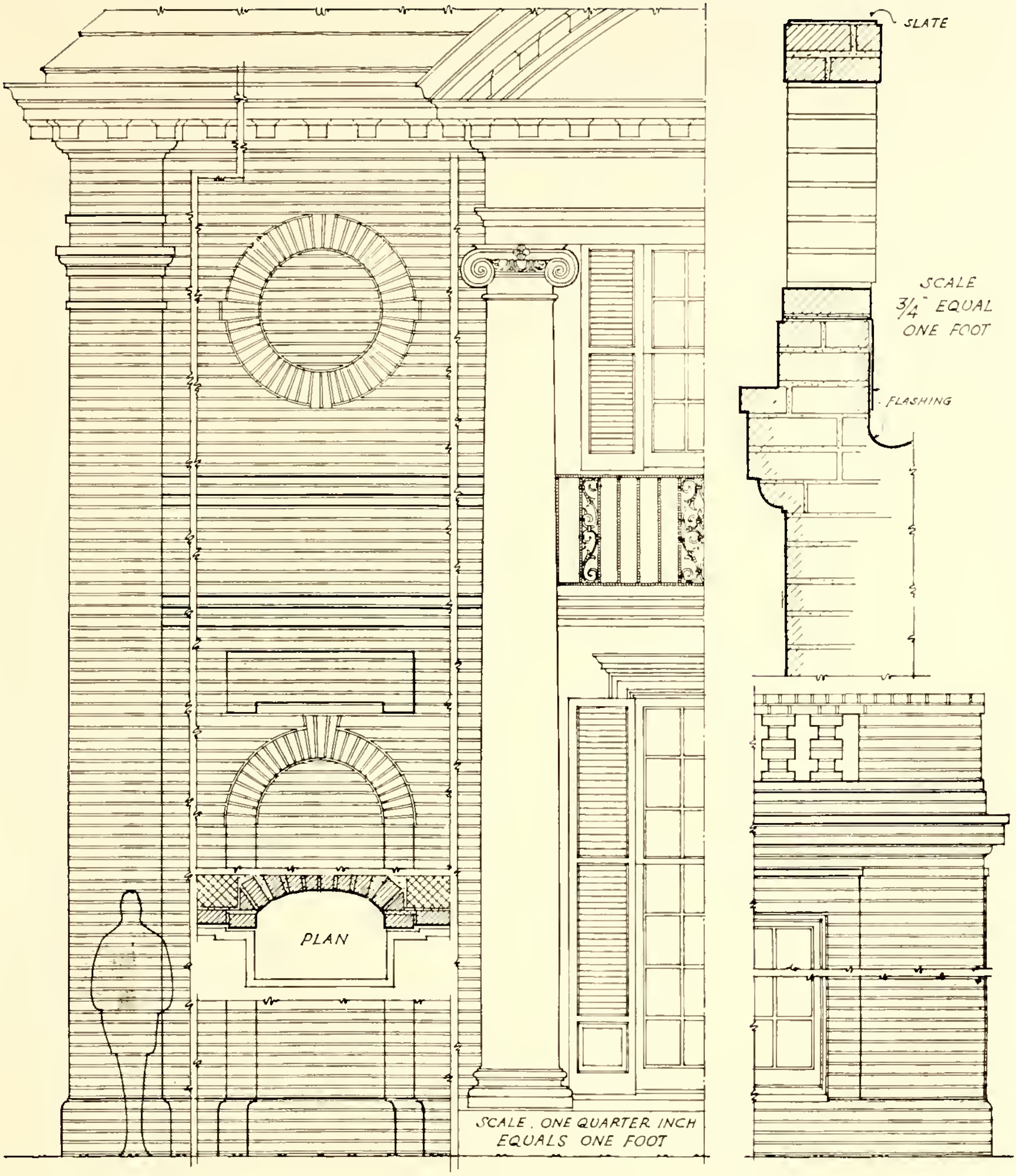
PEABODY, WILSON & BROWN, ARCHITECTS

THE Potter house suggests the design carried out by Wren in Groombridge Place, shown on page 42. It is interesting to compare these two elevations because they serve to illustrate the manner in which architects of today take the best examples of old English brick design as their precedent. The striking difference found is that the modern design is lower and wider; showing no base or foundation. Smaller windows and less height in the second story above the string course, the use of larger and fewer panes of glass, and a lighter, simpler treatment of the corner quoins gives to the wing of the Potter house an appearance of greater size, whereas there is very little difference in the width of the two facades. The brickwork of the two houses is similar except where an arched treatment in the chimneys gives greater dignity to the American house.



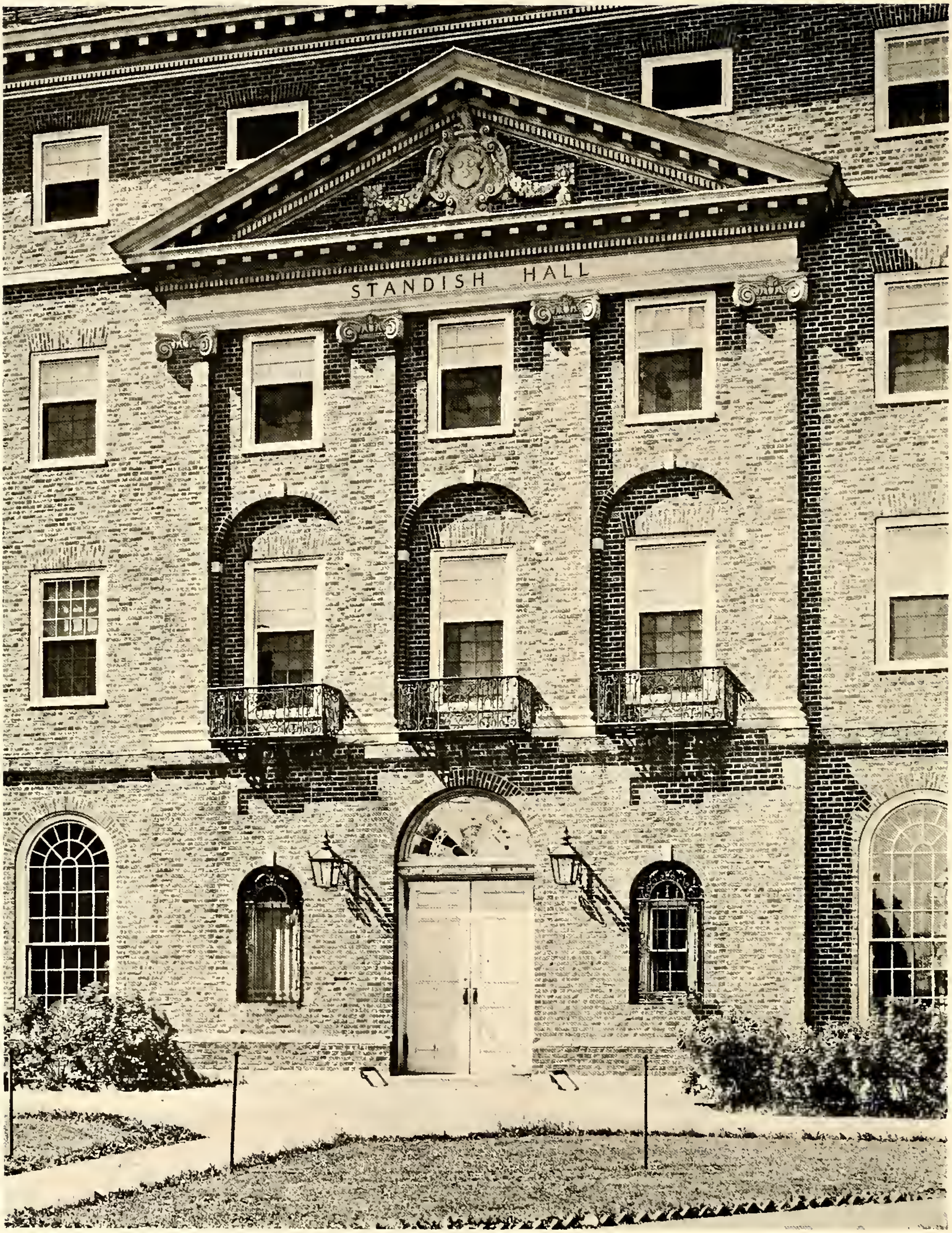
DETAIL OF GARDEN FACADE
HOUSE OF JOHN E. DEFORD, ESQ., MARYLAND
LAURENCE HALL FOWLER, ARCHITECT

Niches, raised panels and key blocks, and ballustrades all in brick add variety to this Georgian design.


SLATE
SCALE 3/4" EQUAL ONE FOOT
FLASHING
PLAN
SCALE, ONE QUARTER INCH EQUALS ONE FOOT

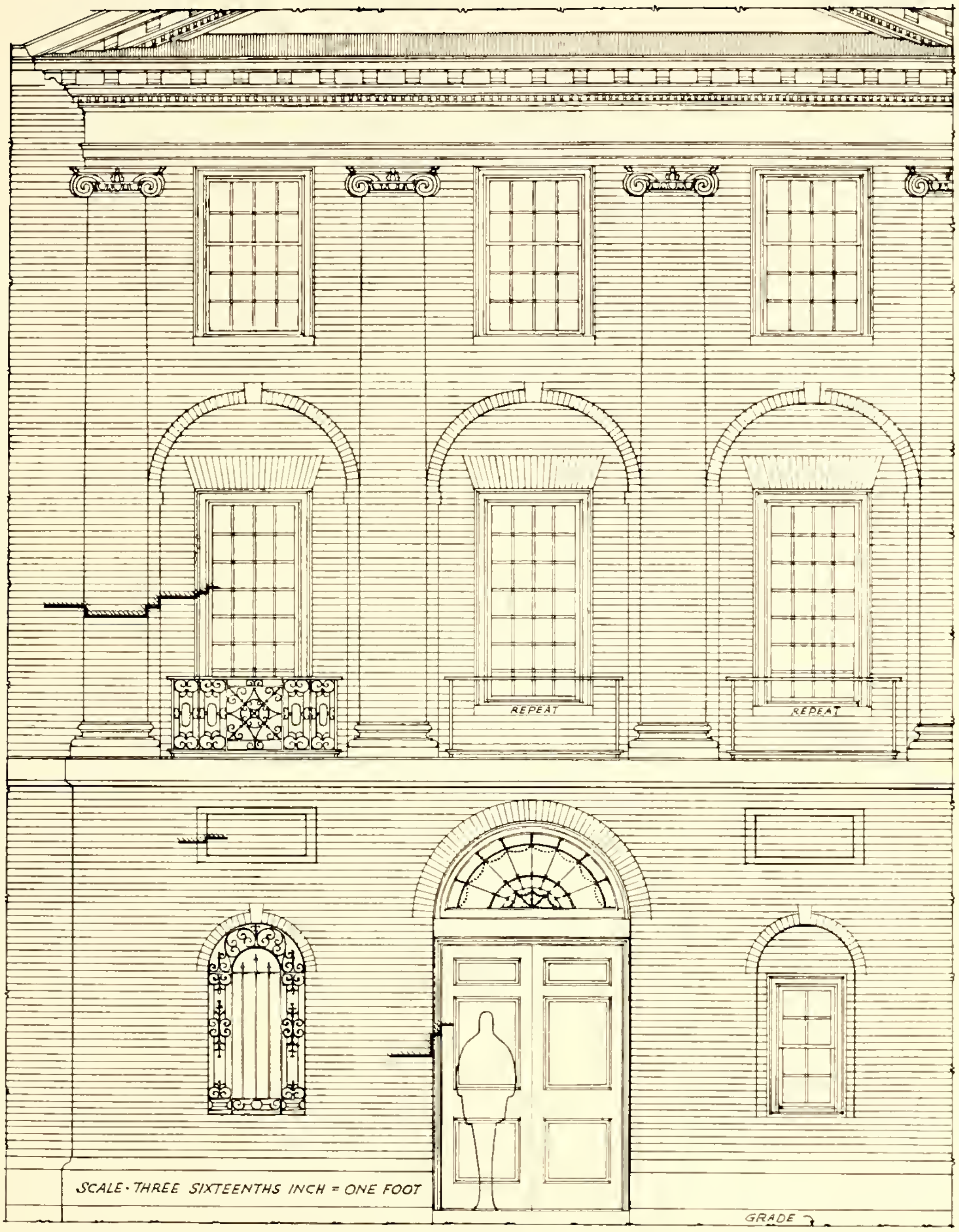
HOUSE IN BALTIMORE COUNTY, MD.
LAURENCE HALL FOWLER ARCHITECT

THE surface of the brick walls has been broken by niches, panels, string courses and corner piers, in a manner quite reminiscent of Wren's Bluecoat School and Queen Anne's Orangery. This house indicates the variety of treatment possible in brick architecture, when handled by skilled designers who understand and appreciate the merits of their medium. The uniformity of material permits the use of diversified detail.



DETAIL OF STANDISH HALL, HARVARD UNIVERSITY
SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS

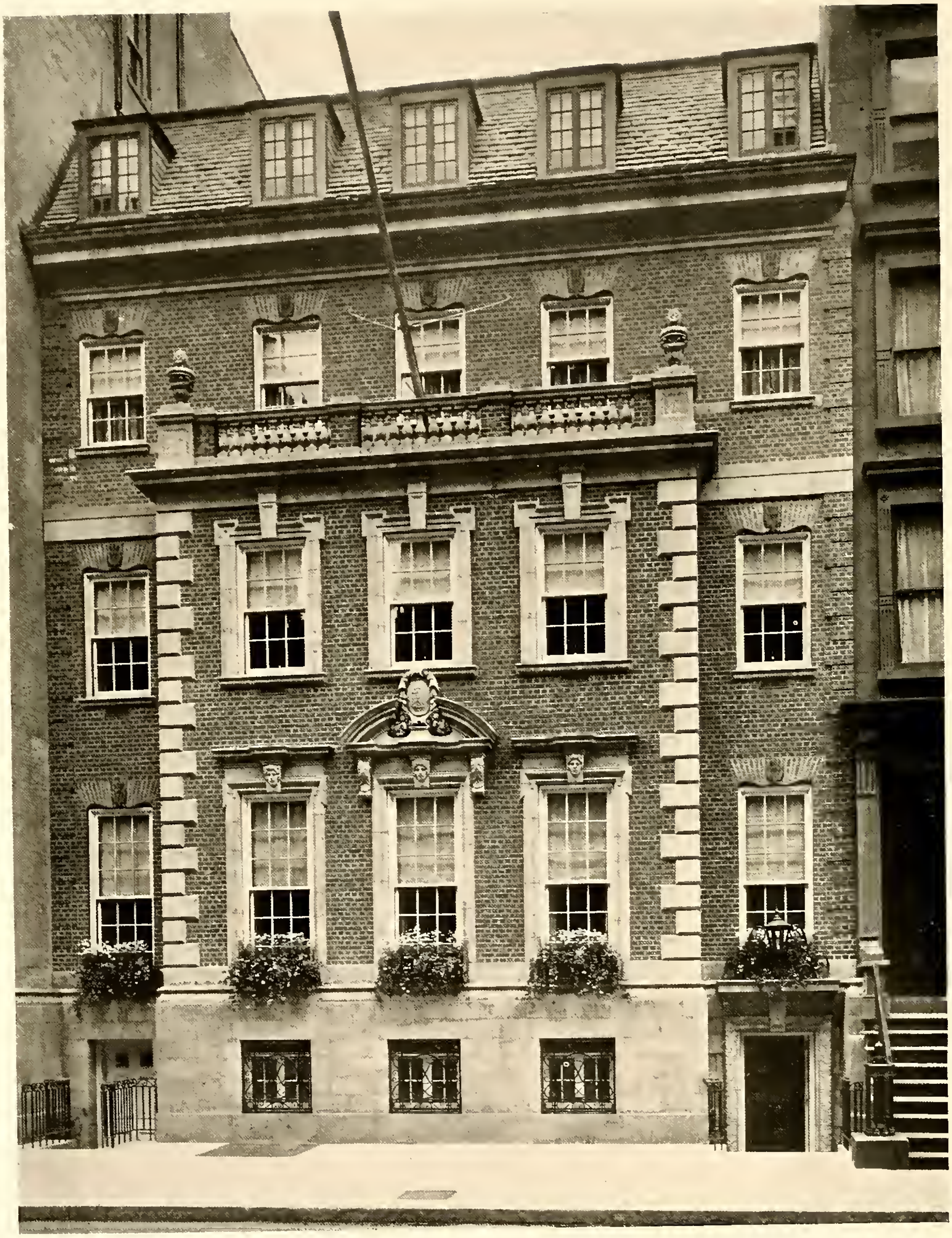
Dignified and simple brickwork with a pleasing rhythm in the entrance bay enlivened by touches of stone in bases, caps, entablature, and pediment.



STANDISH HALL, HARVARD UNIVERSITY

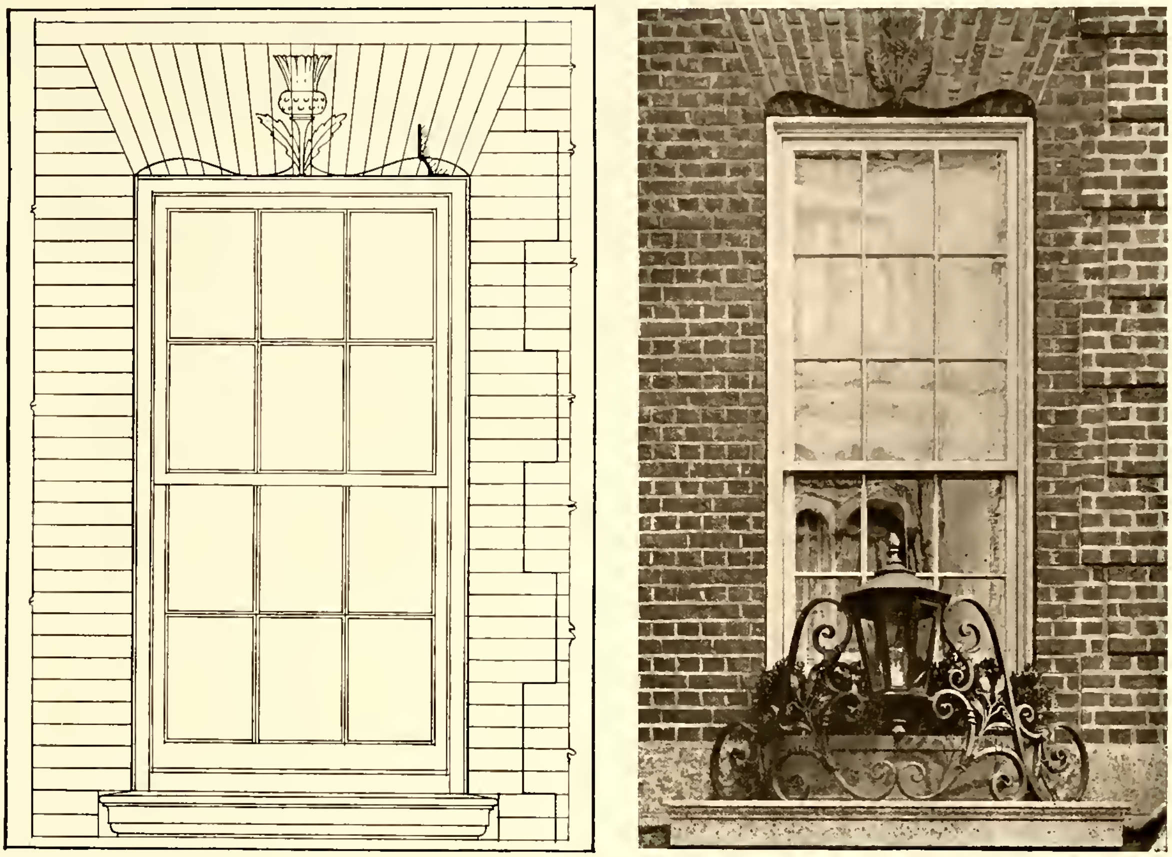
SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS

THE simple vigor of this design has been obtained through the care displayed in proportion. The base shows a pleasing preponderance of brick wall with string course cap.



THE LINKS CLUB, NEW YORK
CROSS & CROSS, ARCHITECTS

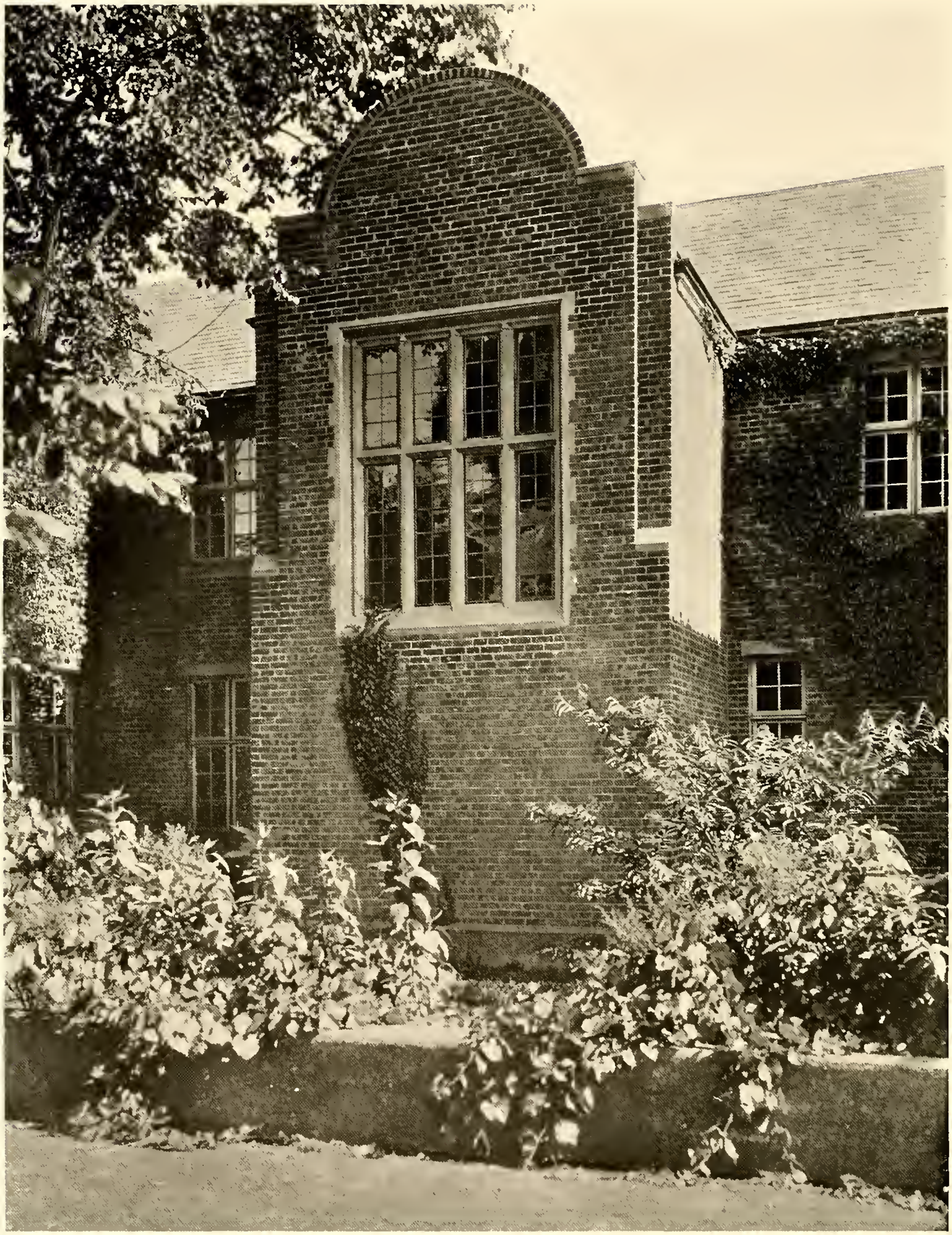
The highest development of the English Renaissance is seen in the center bay; an earlier period shows in the brick quoins and window arches of the main building.



Interesting cut brickwork is shown in the windows of the Links Club, New York
Scale of detail, one-half inch equals one foot

IN the facade of the Links Club, the architects Cross & Cross, have succeeded in the interesting experiment of superimposing a small two story bay of a late style upon a four story facade of an early style of English Renaissance. The outcome is as delightful as it is daring. Even toned red brick, laid in English cross bond, hold together the entire design in point of color and texture, while a broad stone belt course unites the projecting bay and the main building. Bricks cut in the shape of a thistle as a sort of key block above reversed curves on the lower edge of all the window arches of the four story facade, together with simple brick quoins, give charm and distinction to an otherwise simple brick wall. It is a facade that commands attention because of its pleasing color and dignity of architecture.

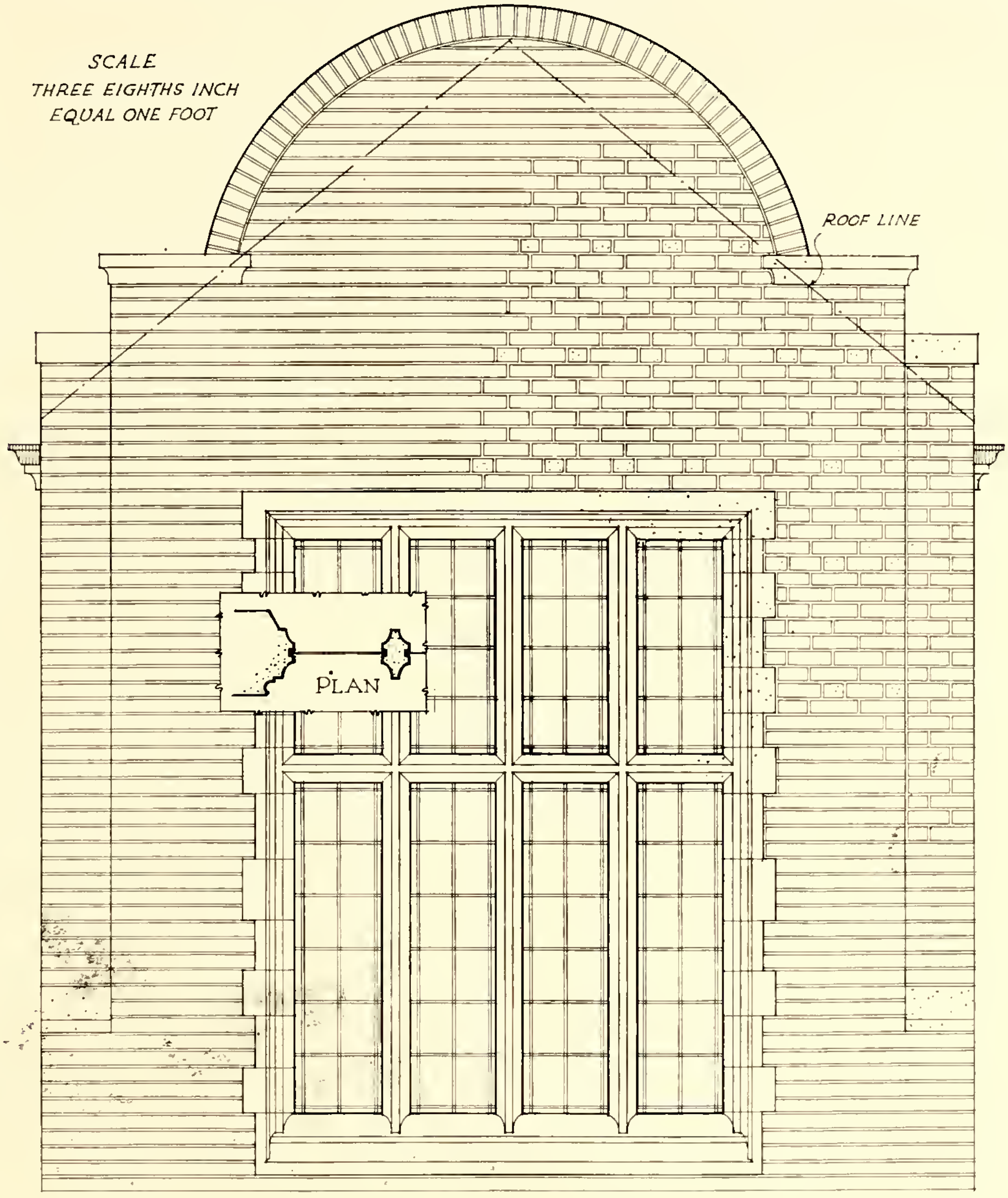
As a material for street facades in city blocks, brick in some ways is better suited than any other material. It costs less to procure and lay, and provides a variety of pleasing surface textures and color tones, unequaled by either stone or marble. Red and the darker shades of brick, in particular, give a warmth of color to a building and at the same time show but little the effect of city smoke and grime. All brick, regardless of color, on account of the size of the units like small panes of glass, give scale to the facade on which they are used. In fact, brick may be regarded as the most adaptable and plastic of building materials. It can be employed with equal success and propriety in any style of architectural design, from the stately Lombard-Romanesque and Gothic churches of Northern Italy to the simple domestic facades of our Colonial ancestors.



DETAIL OF PERKINS INSTITUTE FOR THE BLIND AT WATERTOWN, MASSACHUSETTS

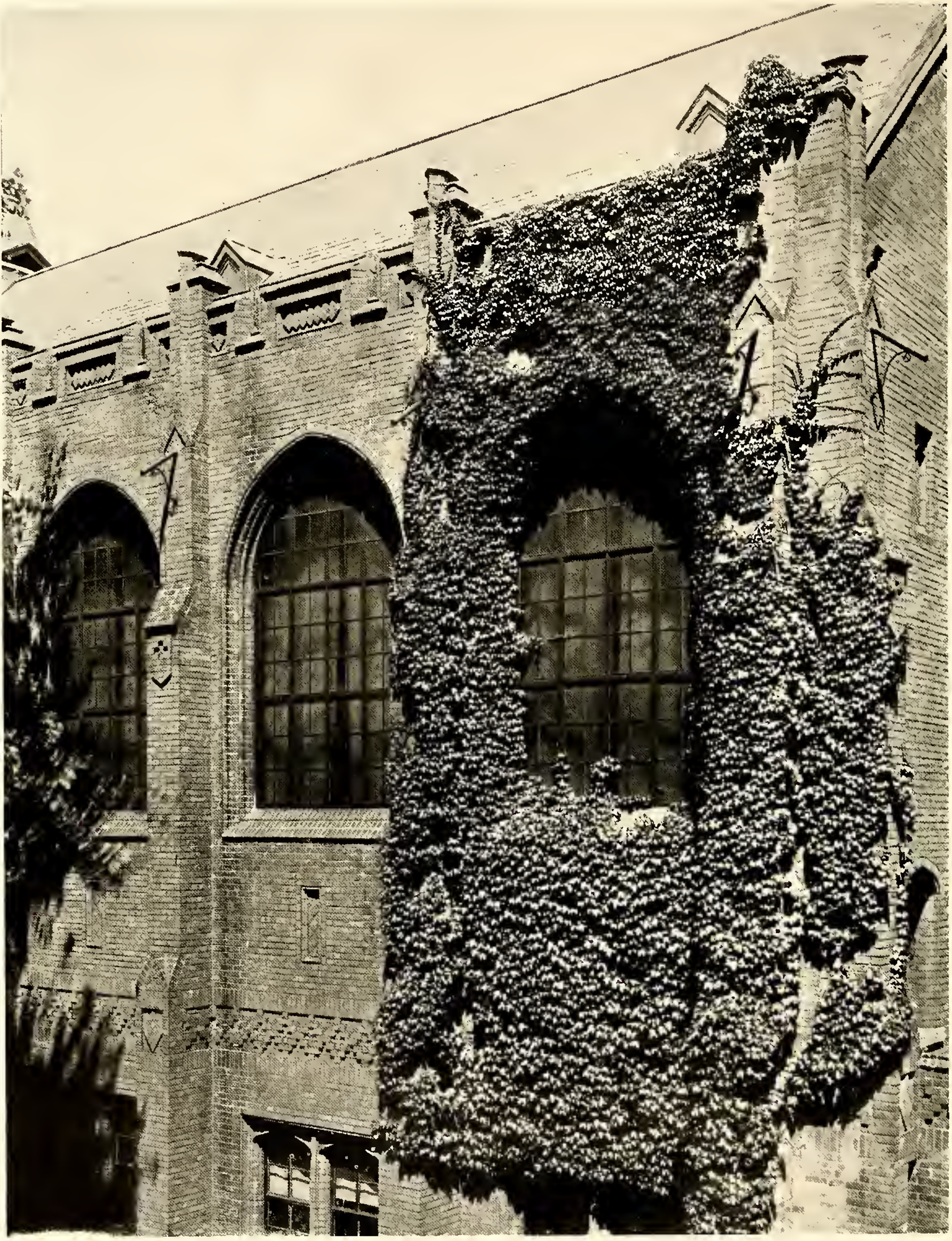
R. CLIPSTON STURGIS, ARCHITECT

The charm of this brickwork lies in its absolute simqlicity, relieved only by the almost imperceptible patterning and the reserved stone trim.



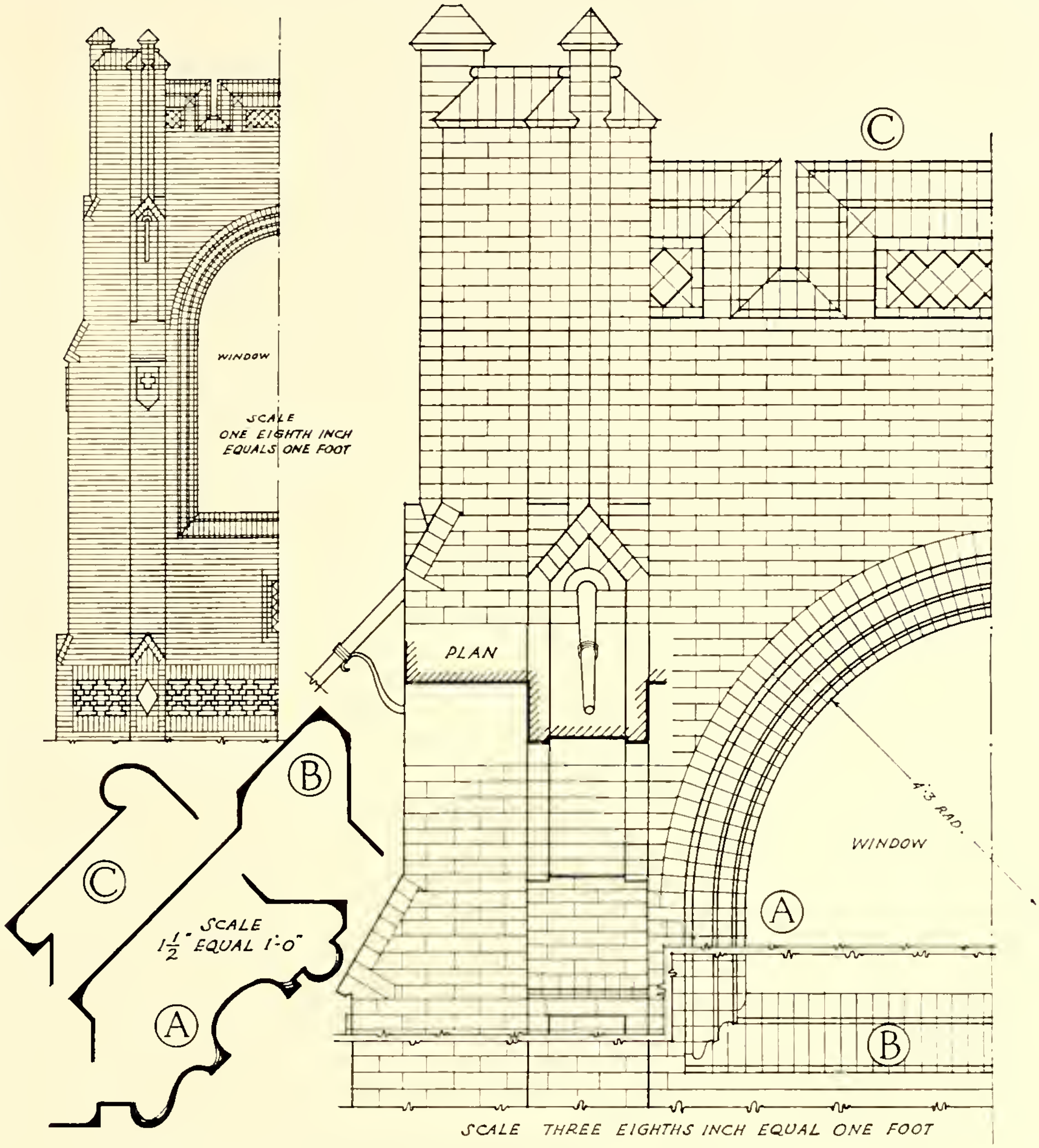
PERKINS INSTITUTE, WATERTOWN, MASS.
R. CLIPSTON STURGIS, ARCHITECT.

SO perfect is the restraint of this design that it might easily have been found in some English example of early Renaissance architecture. The broad unadorned wall surfaces are a delight to all lovers of fine brickwork. The great range of color in the bricks gives a depth of tone and a quality of texture too seldom found in modern brickwork.



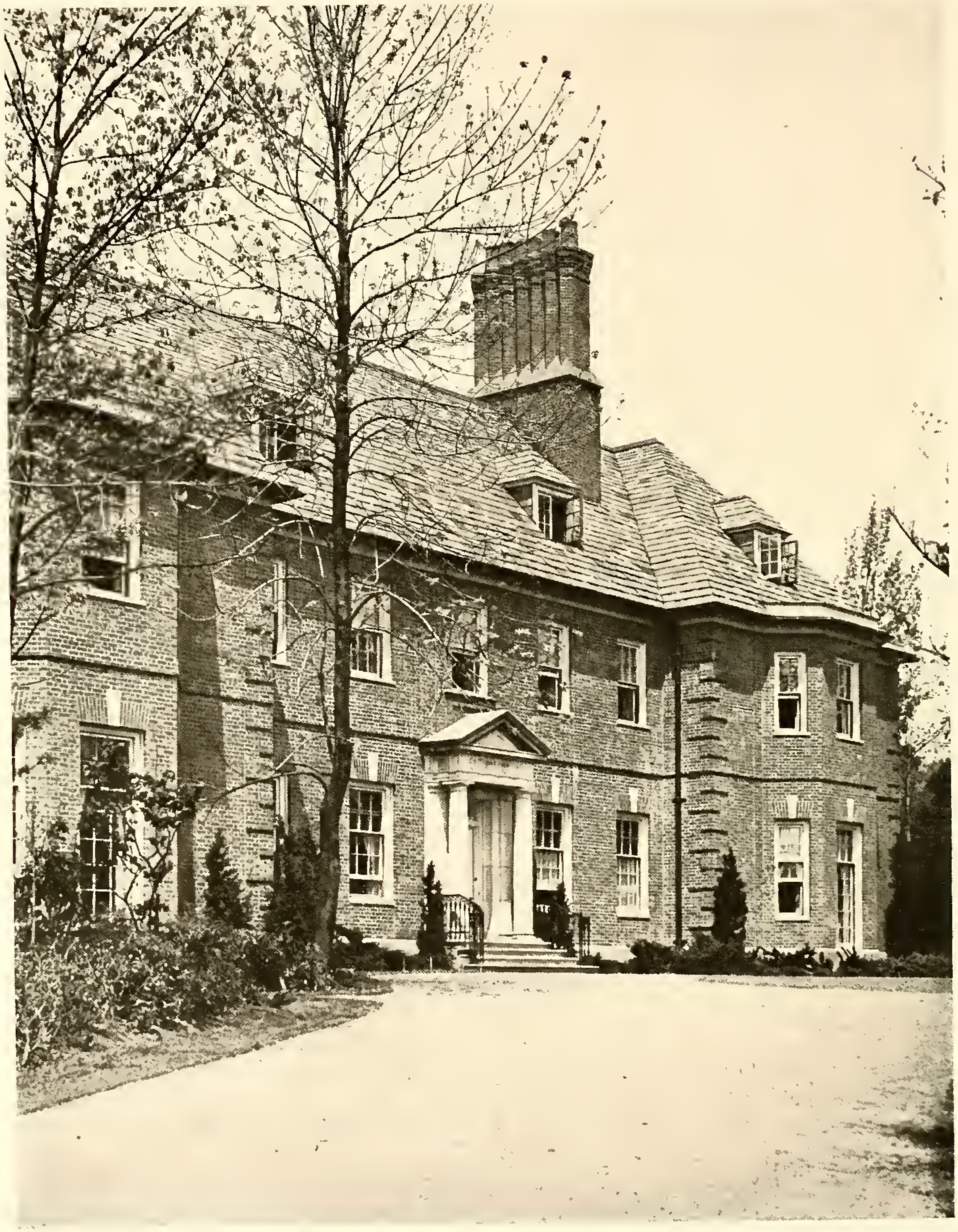
MISSIONS LIBRARY, YALE UNIVERSITY
NEW HAVEN, CONN.
DELANO & ALDRICH, ARCHITECTS

All of the decorative details are of moulded brick, giving unusual charm and uniformity to the design.



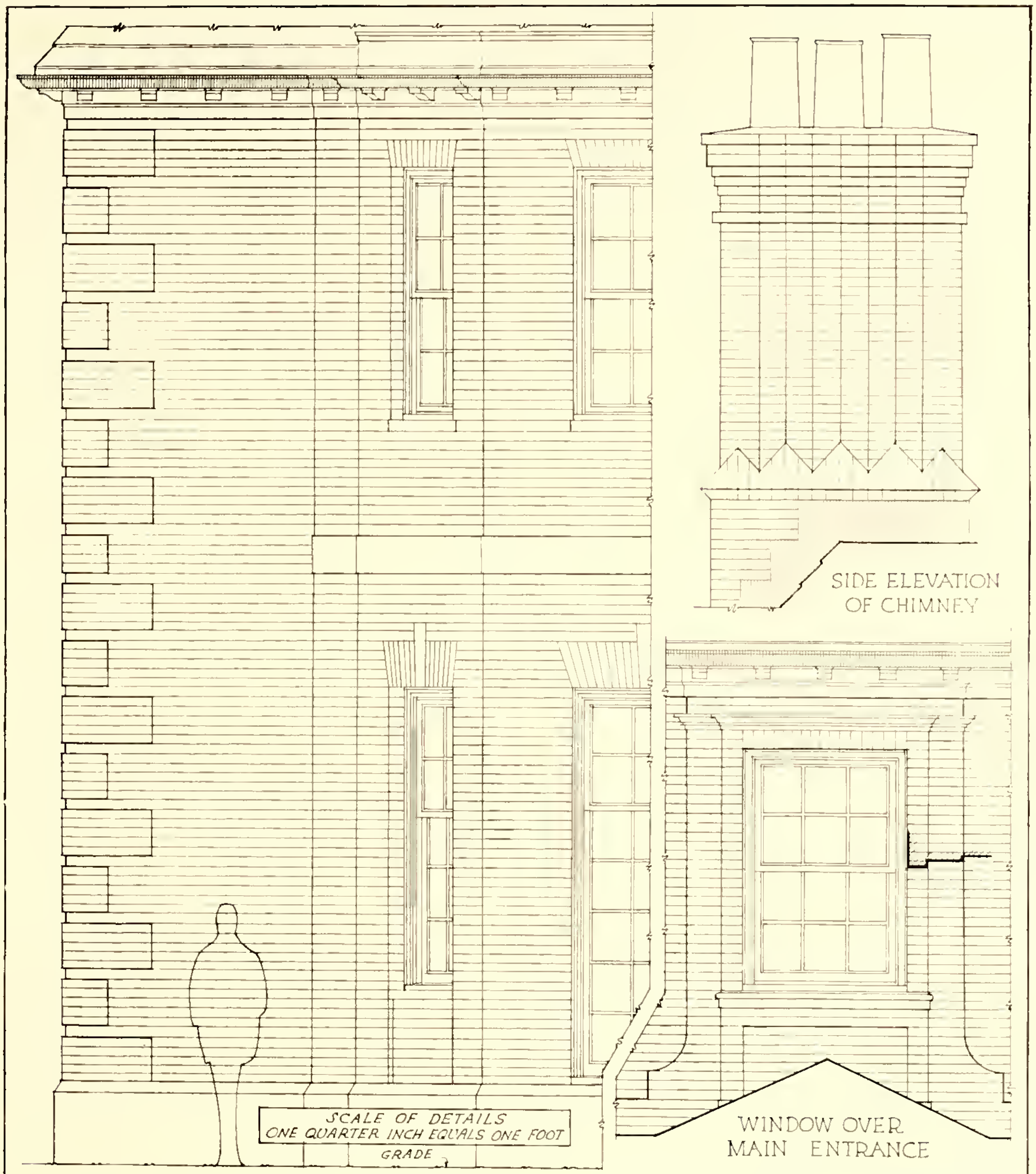
MISSIONS LIBRARY, YALE UNIVERSITY
DELANO AND ALDRICH, ARCHITECTS

AN architectural design is found in the Missions' Library at Yale University, where not only all the structural features but also all the decorative details have been carried out in brick. The mouldings of the great arches, the splays, the cresting, and the sills of the windows show skillful use of moulded brick. Even the mullions of the small double windows on the lower floor were constructed of cut brick, smiliar to the windows in the Almshouses at Audley End, Essex, shown on page 35.



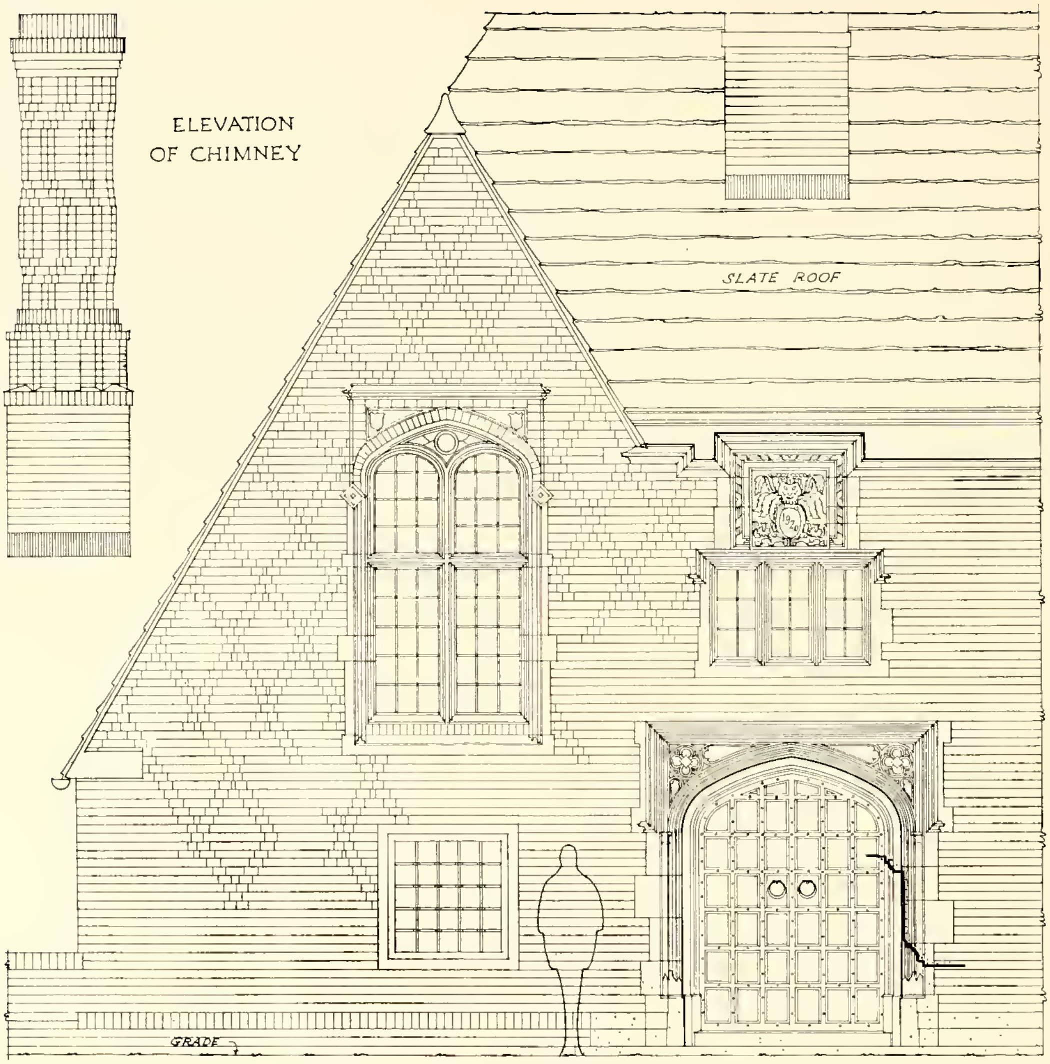
ENTRANCE FACADE OF THE HOUSE OF
CHARLES F. T. SEAVERN, ESQ., HARTFORD, CONN.
GOODWIN, BULLARD & WOOLSEY, ARCHITECTS

A dignified example of modern design derived from early Georgian precedents, in which the grouped chimneys suggest even an earlier period.



SEAVERN HOUSE, HARTFORD, CONN.
GOODWIN, BULLARD & WOOLSEY, ARCHITECTS

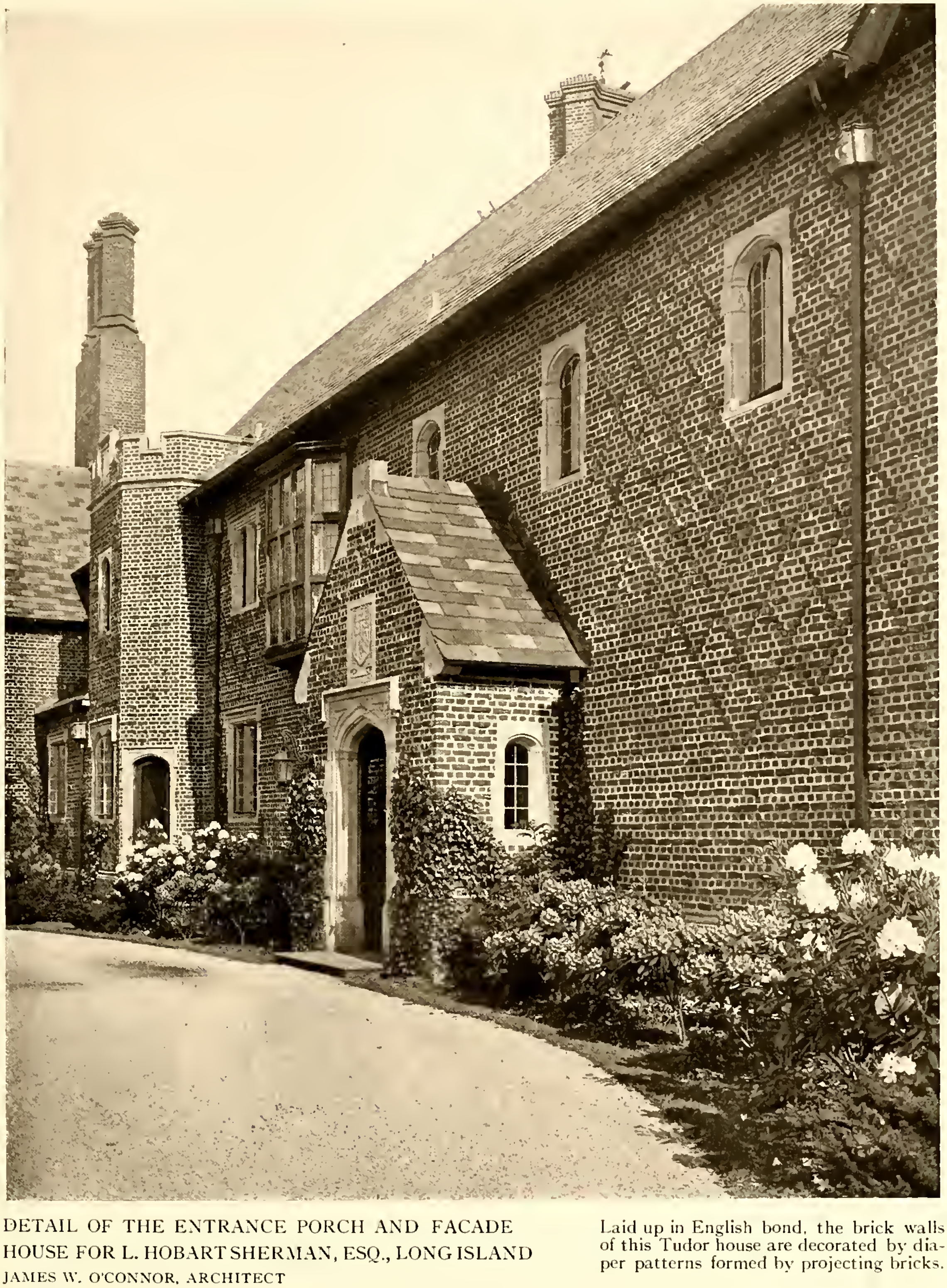
IN this adaptation of English domestic architecture, are found vigor and restraint. In the strongly rusticated corners of the end bays, in the belt course which marks a needed line of shadow between the stories, in the splendidly proportioned Doric entrance porch, in the careful placing and proportioning of the windows, and in the simple cornice almost concealed by the overhanging rough slate roof, there is evidence of careful study.



SCALE THREE SIXTEENTHS INCH EQUAL ONE FOOT

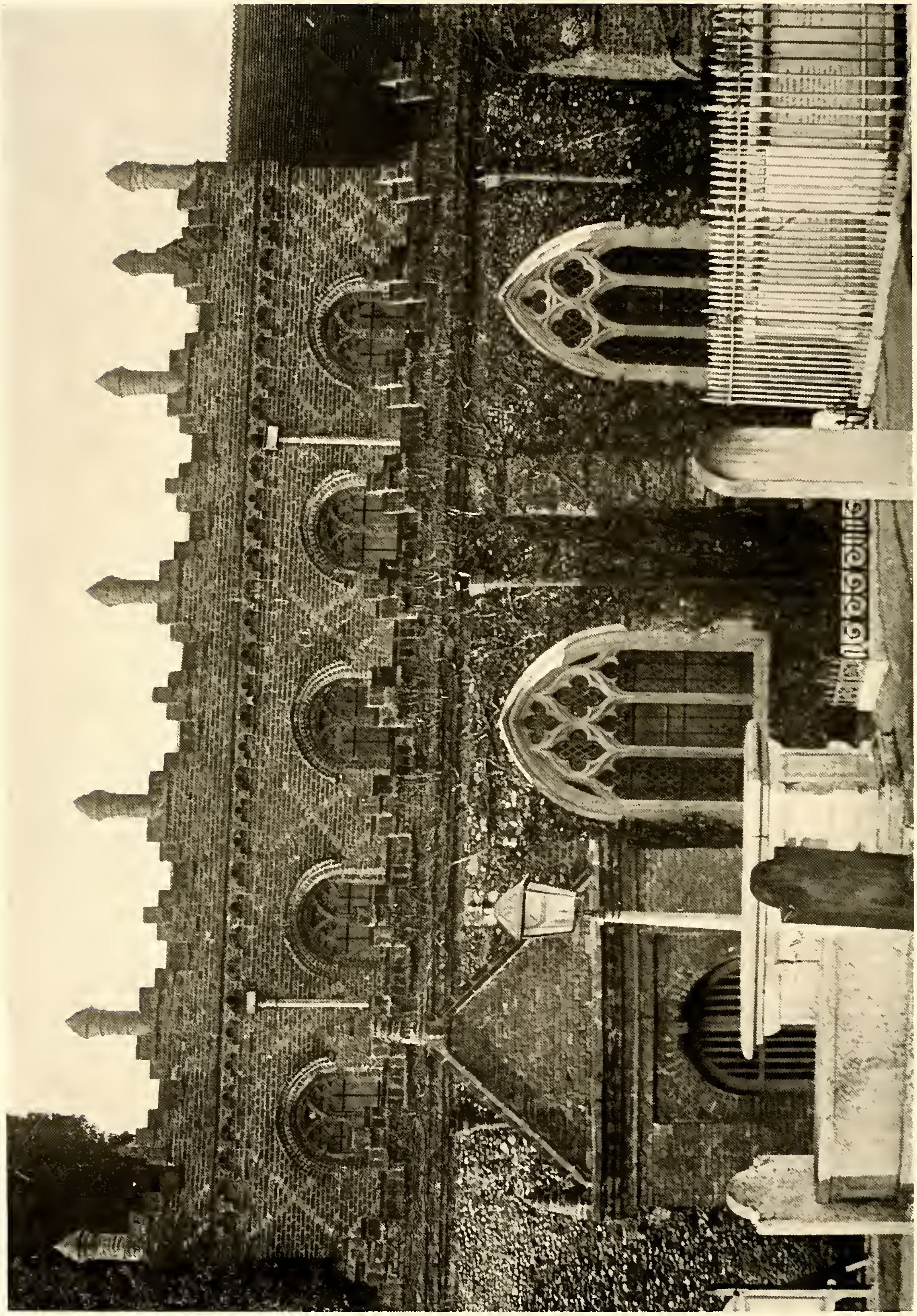
HENDRIX HOUSE, LARCHMONT N.Y.
MANN AND MAC NEILLE, ARCHITECTS.

THE Tudor period of English architecture was the precedent which has been closely followed in the design of this unusually interesting house. The arch of the large window as well as the diaper pattern of the walls, shows a skillful use of brick as a decorative as well as constructional material. The chimneys of this house, one of which is shown above, are excellent examples of the varied shapes in which this essential feature of domestic architectural design may be carried out. They are ingeniously built of standard sized brick in a manner suggesting the cut brick chimneys of Tudor England.



DETAIL OF THE ENTRANCE PORCH AND FACADE
HOUSE FOR L. HOBART SHERMAN, ESQ., LONG ISLAND
JAMES W. O'CONNOR, ARCHITECT

Laid up in English bond, the brick walls of this Tudor house are decorated by diaper patterns formed by projecting bricks.



GREAT BADDOW CHURCH
NEAR CHELMSFORD, ESSEX, ENGLAND

Built in the 16th Century, the brickwork of the clerestory shows interesting patterning, cut brick in the tracery and trim of the arched windows, and in the curious chimney-like pinnacles of the embattled or castlelated parapet.

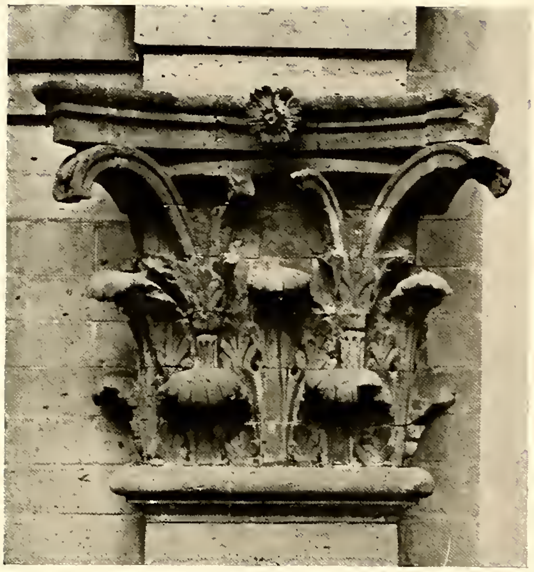
English Rubbed, Cut, Moulded Brick and Their American Counterparts

FROM the very beginning of distinct English brickwork, when it was brought into being in the thirteenth century, there was a ready adoption of various features of surface embellishment, and no doubt the development of these was largely the outcome of customs which the Flemings brought with them. One would be inclined to think that the diaper was the earliest manner of embellishing a large expanse of wall, but the fact might well be that this was a later feature, and that nogging, corbeling and use of strings were the first features. In whatever order they came, however, it is seen that all these various elements were quite commonly employed in Tudor times. Square-headed windows seem to have been a difficulty prior to the building of flat-headed arches with radiating voussoirs, a trick that was to become, in Georgian times, the motif of a style. But that this construction was early appreciated is evident in the windows of Rye House, Hertfordshire, where the heads are carefully radiated.

For splayed arches, both external (as in gateways) and internal (as in church work), moulded bricks of various forms were used, some of them with simple chamfered faces, others with a series of circular members. Cut brickwork was also in use at the same time.

In the brickwork of the English Renaissance the flat rubbed brick arch was a common feature. Heavy classic cornices were built up of 2½-inch bricks, often with dentils and modillions, tiles being used in some cases for the smaller fillets. Effective strings were formed of three or four courses of brick, slightly projected. The climax was reached by architectural embellishments of carefully rubbed and carved brickwork. Fine work, such as Ionic capitals, was often done in one block, built-up and bonded by the use of a resinous substance, so that the joints were rendered almost imperceptible.

A very fine specimen of eighteenth century brickwork is preserved in the Victoria and Albert Museum, South Kensington. It consists of a pedimented feature which once formed the upper part of a house at Enfield. This example, in its completeness, is eloquent not only of the possibilities of carved brickwork, but also of the limitations of the



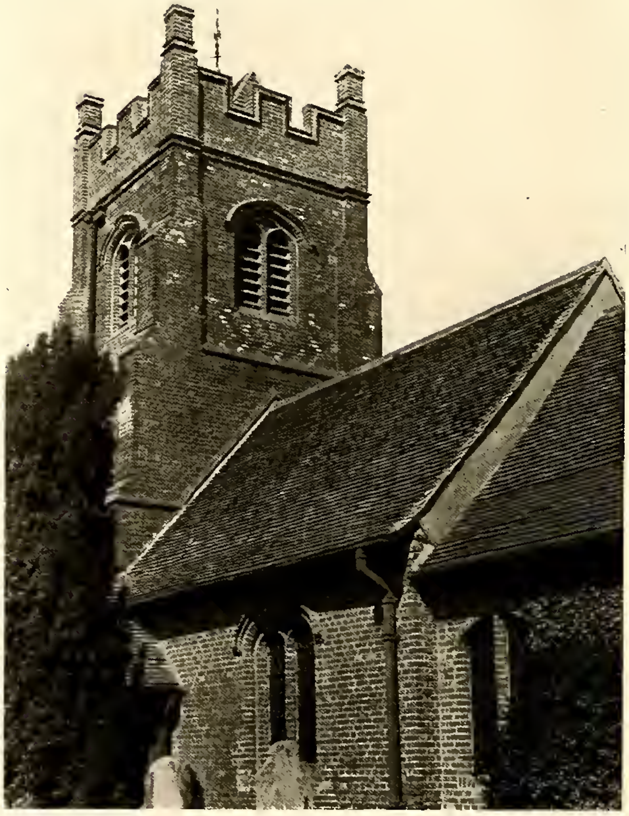
Capital of cut brick from house at Enfield, Middlesex, now in the South Kensington Museum

permit of easy cutting, and being further of a bright cherry color, they contrasted well with the walling brick. It was usual to lay these rubbers up with a narrower joint than that employed in the body of the wall, and no attempt was made except at the top and bottom to have them line with the regular wall courses.

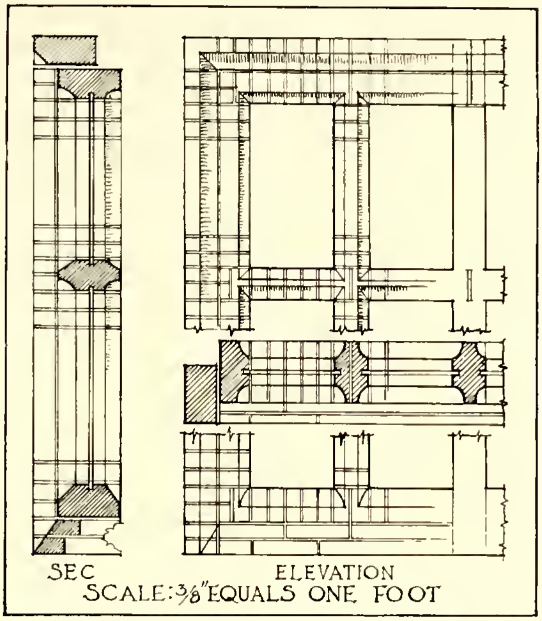
In Tudor work much moulded or, to be more accurate, cut brick was used, yet the number of patterns is small; since these were in practically all cases cut by hand from the ordinary rectangular brick, the workman of 300 years ago

material. The carved pediment is carried on a complete entablature with four Corinthian pilasters, between the outer two of which on each side is a niche with a cherub's head at the top, and a swag on a panel above.

In Georgian times the lower edge of a flat window arch was often cut half a brick in depth in a reverse scroll, and the brick key was further ornamented with a carved thistle or some similar device; this, together with a brick paneled apron below the window, lent an air of grace to a facade severely classical. The bricks so treated in English work were known as "rubbers"; they were comparatively soft and of fine texture so as to

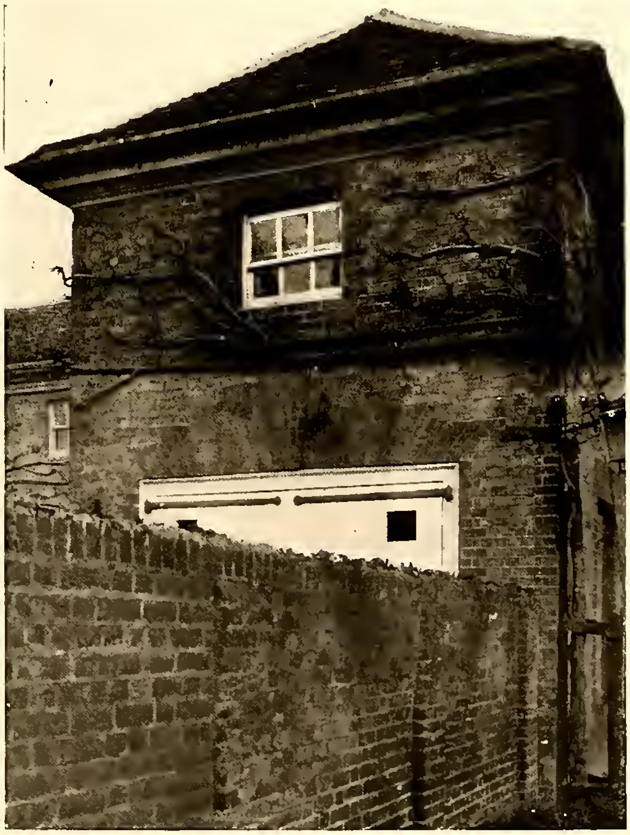


The late 15th Century brick tower of Chignall Smealy Church, Essex, showing cut brick in the window trim and tracery and in the castlelated parapet did not elaborate his sections to rank with those of classical stonework. He did not attempt to imitate stonework, but kept his brickwork severe in character with just the requisite oversail of courses and proportion, to get the shadow effects he needed. A good example which indicates the simplicity of Tudor brick moulding is shown in the detail of the windows of Ingatestone Hall, Essex, built in the early seventeenth century.



Detail of Tudor moulded brick windows in Ingatestone Hall, Essex

The moulding of the jambs, head and mullions is a simple flat hollow inside and out, 2¾ x 1½ inches, and the bricks are symmetrical. The transoms are splayed on the top edges, and the sills are also splayed at 45 degrees. The inner frame is surrounded on the outside by a splayed outer jamb, head and sill, the splay of the latter being steep and in two courses. The dimensions of the bricks are 10 x 5 x 2⅜ inches, and grooves are provided for leaded lights. Jointing is shown exactly in accord with the original building.

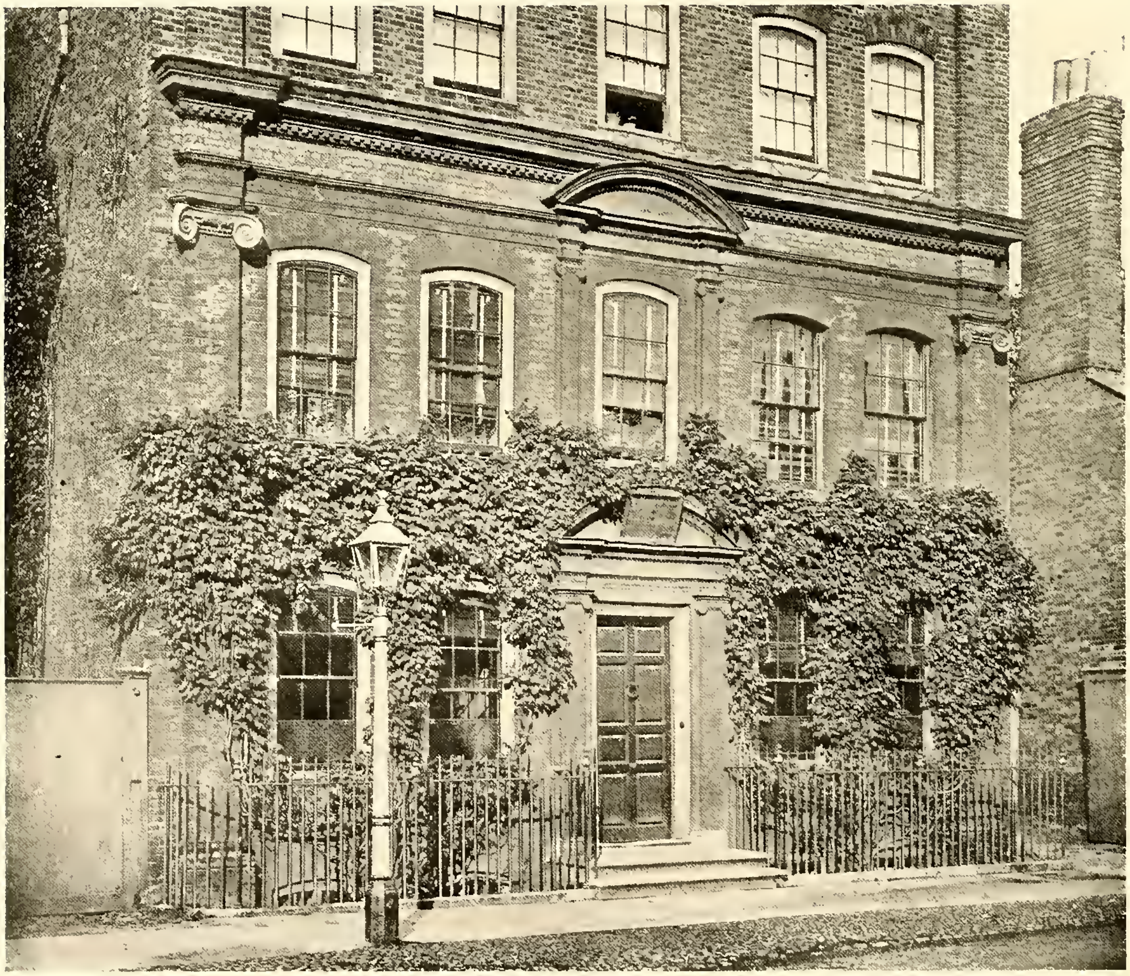


Stables—Douglas House, Petersham, Surrey. Showing unusual brick treatment in arch over door

In America the effects of cut or rubbed brick are secured almost exclusively by the use of moulded forms or by special treatment in setting standard sizes. Of such uses we have many excellent examples as those previously shown in the Missions Library at Yale, the Vanderbilt house, and the Links Club.

American architects have very highly developed the application of standard sized brick in securing rhythm and life in the wall surface not only by patterning but by recessed brick courses in arches, string bands, corbeled brackets, cornices, panels, pilasters, and the like, which, with color blends and jointings, open up unlimited possibilities for sound treatment and genuine artistry in the facing of the brick wall.

There are many modern examples of the use of moulded brick for the trim, the sills and the tracery of windows of which a fine example is found in the Missions Library at Yale University, where it has been so successfully used that the building looks as though it might have been built in the seventeenth century.



House at Hertford, built about 1780, showing cut and rubbed brick in the entablature pediment, and pilaster caps.

Bonds and Mortar in English Brickwork

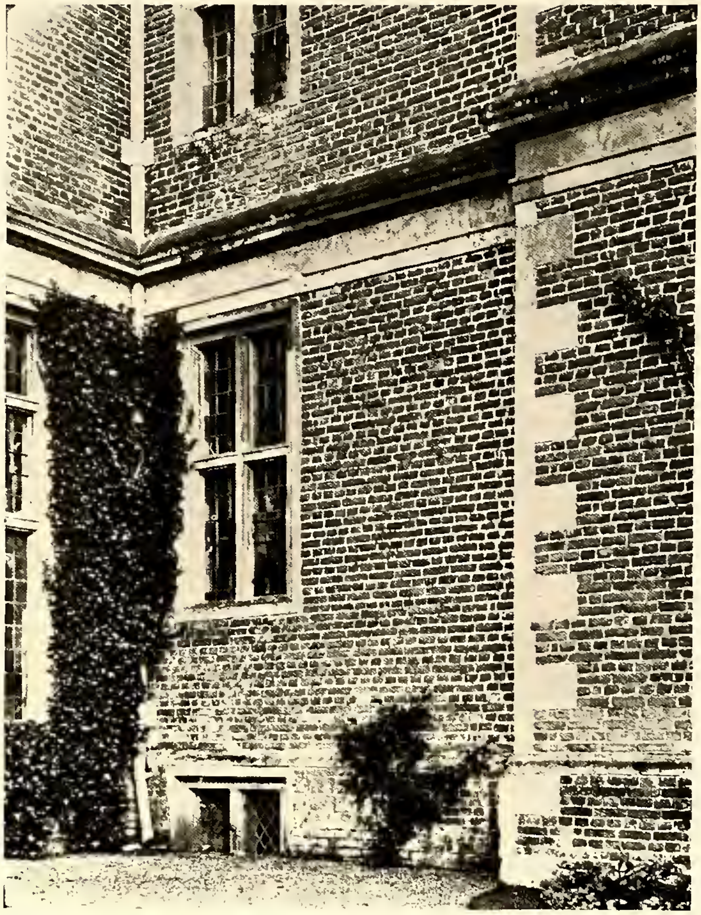
THROUGHOUT the Tudor period long thin bricks were used, and the joints were made with lime mortar—good thick joints, wiped off flush with the wall face. Usually five courses went to the foot, but sometimes an especially thin brick was used, in some cases as thin as 1½ inches. English bond was the bond usually adopted. During the Tudor and Georgian periods there was no definite uniformity in the size of the bricks; in fact there is no such uniformity today in England, though repeatedly an endeavor has been made to establish a standard. In the United States a standard size of approximately 8 x 2¼ x 3¾-3⅞ inches has been adopted for face and common brick.

Face joints are commonly struck or tuck-pointed, but with many English architects who have made a special study of old craftsmanship there is a strong feeling that struck joints are undesirable, and that the best method of finishing brickwork is with a flush joint wiped off either with the trowel or with a wooden tool.

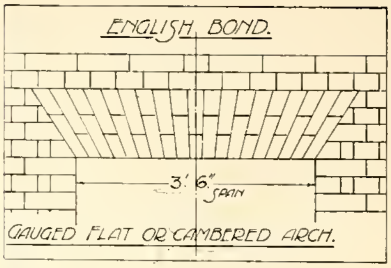
The artistic value of brickwork depends largely upon the width of the joint and the color and texture of the mortar used. Broadly stated, a brick of smooth, even surface should never be laid in rough mortar and with wide joints; while one of rough texture depends upon wide joints and coarse mortar for its best effect.

The softening and neutralization of masses of red brick by broad white joints is now well understood, but from many examples noted the problem of handling color in the joints is sure to be not so successfully solved. It is a matter that should receive careful study by the designer when attempted. The color of the mortar when set and fully dried is likely to be quite different from its appearance when fresh, and this must of course be considered when the mixing is done. Dark joints are usually too set and rigid in their definitions if the brick is light in tone; it is well to keep a dark joint in similar tone to the brick but different in color from it. Similarly with brick pattern work, exaggeration must be looked out for. The contrast of tone between headers and stretchers need not be great as there will be considerable contrast produced by the regular recurrence of the alternate units, and strong color differences will destroy the unity of the mass.

Brickwork of any period, ancient or modern, owes no small part



Shaw House, built by Thomas Dulman in 1581, shows walling laid in English bond with local bricks, all 2¾ inches thick, varying in length from 9 to 11 inches, and in width from 4 to 5 inches

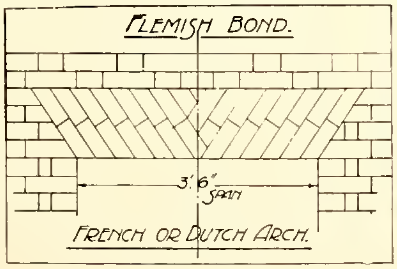


of its beauty and interest to the method of laying or the "bonding." To the casual observer the ordinary running bond consisting of stretchers only, breaking joints, appears structural and satisfying, particularly if a range of color in the bricks removes the monotony of a constantly repeating pattern, but to the eye trained to structural and decorative surface treatment something else must be presented to gain favorable consideration. A definite scheme of laying brick so that both headers and stretchers show in the face of the wall provides aesthetic satisfaction and at the same time increases the strength of the wall. Bonding possesses importance from a purely structural point of view, since the use of stretchers in large proportion secures strength to a wall in its length, while the use of headers, which extend through the wall, provides transverse strength.

Centuries ago it was discovered that brick could be so laid that without the sacrifice of structural strength the bricks in the wall would form a definite pattern. This led to considerable variety in methods of brick laying or bonds, but all bonds are derived from three chief types: Running or Stretcher, English, and Flemish bond. Garden Wall bond is sometimes added, but it seems to be more properly a derivation of Flemish bond. All these types are susceptible of endless variations.

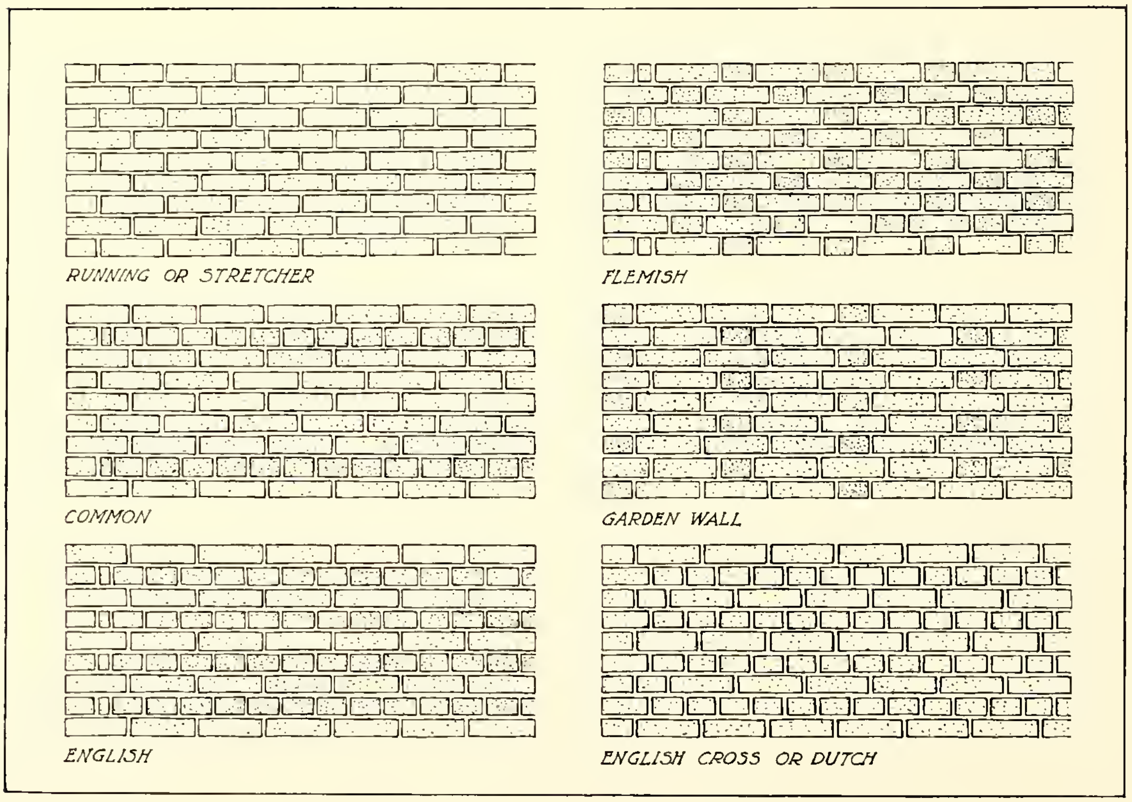
Running or Stretcher Bond is that by which a wall is laid up wholly of stretchers, there being at the end or corner of every alternate course a header which becomes a stretcher after the corner has been turned. The chief objections to use of this bond, as just indicated, are that it becomes monotonous when used in mass, and also that while possessing strength *lengthwise* it has but little strength *through* the wall. A course of headers is often added every fifth or sixth course, the result being what is called Common or American bond. Even with the variation given by this use of headers, the resulting wall is likely to lack interest, and in work of any pretensions, it is therefore, usual to choose one of the other bonds.

English Bond makes use of courses of stretchers alternating with courses of headers. Owing to the large proportion of headers extending through the wall this bond insures a wall so extremely strong that it is often used for walls in connection with engineering projects. It is the bond most frequently used in old Tudor work, but it has been little used in America because of its expense and a lack of preference for its pattern. A variation that produces a more pleasing effect is called English Cross or Dutch bond and consists in having the stretchers of the successive stretcher courses break joint with each other, as well as with the headers in the adjoining courses on the



Brickwork laid in Flemish bond. Lathrop Brown residence, Long Island, N. Y. Peabody, Wilson & Brown, Architects face of the wall. Difficulty is sometimes experienced in getting an absolute alignment of vertical joints in English bond; the effort in this direction may not always be compensated for by the result, and the charm of the English bonded wall of Shaw House, shown on page 92, in which exact alignment was not aimed at, would seem to prove the point.

Flemish Bond is regarded by many architects and builders as the most desirable of all bonds. Each course is laid up of alternating stretchers and headers, a header resting upon the middle of each stretcher. A wall laid in Flemish bond, therefore, presents a succession of Greek crosses, and is easily made more effective by using brick of different tones and textures at certain points. The basic principle upon which Flemish bond is laid may be extended indefinitely, and what is known as Garden Wall bond is secured merely by using two or more stretchers instead of one between two headers. Both English and Flemish bonds require the use of "closers," which are split headers, one set next to the header brick occurring at an angle or at any vertical line, such as window or door openings, in every other course.



Production of Face Brick

A DEFINITION of face brick will be helpful at the outset as there is often confusion on the subject. A face brick is so called not because it has a particular kind of finish on its face, but simply because it is suitable for the exterior or interior surface or "face" of a wall. Thus, any brick which, by reason of its color, texture, or burn, is selected or specially manufactured and carefully laid to enhance the attractiveness of the wall surface is a face brick. In the early days of brickmaking—and even now in certain localities—where manufacture was more or less haphazard, the best brick in the kiln were selected for facing. In time, this suggested a little more care in the process of manufacture. Care in molding the clay, setting the ware in the kiln, and burning brought out what were known as "stretchers" or facing brick, and then with a growing and diversified demand modern methods were gradually introduced until the production of "face," "front," or "facing" brick has become a nation-wide industry.

During the past generation, there has occurred, as in many other industries, a veritable revolution in the manufacture of brick. The American brick manufacturer has developed a range and variety of color that never before existed in the product, and exists nowhere else in the world. Not only do different clays burn to widely different colors, but the bricks in the kiln may be played upon by the flame, smoke, and gases in such a way as to acquire many beautiful varied tones and shadings. Aside from a few colors, secured by the introduction of mineral substances into the clay, the vast majority of brick colors and color tones, running into many hundreds, are the natural outcome of the clay and the kiln burn. And what gives these colors their essential merit is that they are fixed as an integral and permanent set in the brick substance itself.

Mere surface texture in the brick wall is an element of great architectural importance, and in texture, as in color, the modern face brick manufacturer has anticipated the widely diversified requirements of architects. The surface textures of brick, from the smoothest to the roughest finish exert a subtle and profound effect on the tone of the wall surface only less important than the basal color itself. In a scale of brick textures, beginning with the smoothest surfaces, with sharp, true arrises, the next step may be regarded as the sand mold brick with its slightly roughened surface. Then comes what is commonly known as the mat brick with a soft, velvety surface produced by the drag of a wire over the fresh clay, leaving fine vertical or horizontal scorings upon the brick. Beyond that, a great variety of scarifications is used for shadow effects.

The various kinds of clay used for brick making may in point of physical formation be grouped under three heads, as surface clays, shales, and refractories. As to color in the finished ware, they may be regarded as falling into three classes, red burning, buff burning, and gray burning clays, due mainly to the varying amounts of iron oxides, lime, or magnesia in the clay. Iron oxides tend to produce red, dark brown, and purple color tones in the burn, lime tends to whitish tones, and magnesia to light brown or tan. Lime with the iron runs to cream colors, while magnesia with the iron produces buff and yellow tones. Clays without iron or magnesia burn white. The exact outcome, however, depends on the manner and the degree of the burn, on the amount of each impurity contained in the clay, and on the varying proportions of these impurities present.

The surface clays are naturally the most easily mined, as the overburden is light and readily stripped off, while the clay is gathered by scrapers or steam shovels. Shales are clays reduced by heavy pressure in nature to a very dense mass, in some cases, to well nigh the consistency of slate. After being stripped of the overburden, a pit is developed, where necessary, so that the shale bank may be "planed" from top to bottom by machinery adapted to the purpose, "bitten out" by very powerful steam shovels, or, when too hard for such methods, blasted. The surface clays and shales burn to all imaginable shades of buff, red, brown, purple, green, bronze, and analogous tones. Refractory clays, which as the name indicates, resist the fire and fuse only at a very high temperature, are usually found in connection with coal measures and must be won by mining, very much as is coal. These burn to the buff, cream, light brown, and gray tones.

Up to comparatively recent times, brick were generally made by hand; that is, the soft tempered clay was pressed by hand into wooden—subsequently iron or steel—molds of the proper shape and size, and then slipped out carefully on the ground or on racks to dry until the brick were ready to be built into a kiln. To facilitate the slipping of the fresh clay from the molds, the molds before each operation were immersed or slopped in water, or sprinkled with sand. Hence the expressions "slop mold" or "sand mold" brick. The old expression "water struck" is anther name for a slop mold brick, because the molder after dipping his "striker" into water scraped it across the top of the molds to even up the exposed surface of the clay. In some localities the old methods still survive, but during the past fifty years the rapid expansion of trade and a growing demand have necessarily induced the invention of power machinery for the manufacture of brick.

For machine made brick, while the clay, after being gathered from pit or mine may be left for a period in the open to weather, it is usually put at once into process of manufacture. Where the material comes in lumps too large for the dry pan, it is run through crushers to reduce it to the proper size. The dry pan consists of an encased revolving perforated circular steel plate over which are run, contrary-wise to the revolving plate, a pair of very heavy rollers. The crushed clay, falling through the perforations of the steel plate, is conveyed by belts to screens of proper mesh for selection. Whatever fails to pass the screens is automatically conveyed back to the dry pan. The screened clay is then treated in one of three ways. It is thoroughly mixed, or pugged as it is called, in a box provided with revolving knives, to the consistency of a soft mud or a stiff mud, or it is directly used in the condition of a semi-dry powder.

In the soft mud process, the machine presses the pugged clay into automatically slopped or sanded molds. In the stiff mud process, the pugged clay is forced by a powerful auger machine through a die of the proper cross section, in the form of a clay ribbon, which is carried on a moving belt to a slotted, steel cutting table, where a frame, strung with fine piano wires, descends and cuts the clay ribbon into the prearranged widths or lengths. Following the molding or cutting the green brick stacked on cars are run into the dry house, a long low chamber where the excess moisture is expelled. In the dry press process, the almost dry, powdered clay is forced into the molds by extremely heavy pressure and automatically released on the off-bearing table in front of the machine. As these brick need little or no drying, they may be taken directly to the kiln.

Most brick are now burnt in permanent kilns which are either of the periodic down draft, continuous, or tunnel type. Periodic kilns are those in which the brick are set, burnt off, and drawn, to make way for the next batch; continuous kilns, as the name suggests, are built in connected batteries so that each burning chamber starts its successor; tunnel kilns are constructed to accommodate a train of small fireproof cars laden with green brick which are slowly driven through the fired tunnel to the end where they come out finished ware.

The burning of brick, under modern demands for quality in the product, has been greatly furthered by the application of scientific methods of firing and recording temperatures, but it still requires great watchfulness and skill on the part of the burner.

The great variety in modern face brick does not depend simply upon the clay itself and its preparation. Many effects are secured in the process of machining or molding the brick, and in burning. Thus, to meet every requirement or demand of taste, brick are made with every possible surface texture and in uniform shades and varied flashings.

Officers, Directors and Members

American Face Brick Association

1924

B. W. BALLOU, President
T. P. CUTHBERT, 1st Vice-President
E. F. PLUMB, 2nd Vice-President
R. D. T. HOLLOWELL, Secretary-Treasurer

Directors

A. B. ADAMS
Key-James Brick Co.,
Alton Park, Tenn.

J. M. ADAMS
The Ironclay Brick Co.,
Columbus, Ohio.

B. W. BALLOU
Kansas Buff Brick & Mfg. Co.,
Kansas City, Mo.

GEORGE A. BASS
Hydraulic-Press Brick Co.,
St. Louis, Mo.

P. B. BELDEN
The Belden Brick Co.,
Canton, Ohio.

J. W. BOGUE
V. V. V. Brick & Tile Co.,
Neodesha, Kans.

F. W. BUTTERWORTH
Western Brick Co.,
Danville, Ill.

T. P. CUTHBERT
Fallston Fire Clay Co.,
Pittsburgh, Pa.

THOS. B. DREHER
Auburn Shale Brick Co.,
Auburn, Pa.

HOWARD FROST
Los Angeles Pressed Brick Co.,
Los Angeles, Cal.

WM. L. HANLEY, Jr.
Bradford Brick & Tile Co.,
Bradford, Pa.

W. H. HOAGLAND
Claycraft Mining & Brick Co.,
Columbus, O.

B. MIFFLIN HOOD
Legg Brick Co.,
Atlanta, Ga.

H. C. KLEYMEYER
Standard Brick Mfg. Co.
Evansville, Ind.

S. C. MARTIN
Kittanning Brick & Fire Clay Co.,
Pittsburgh, Pa.

E. F. PLUMB
Streator Brick Co.,
Streator, Ill.

EBEN RODGERS
Alton Brick Co.,
Alton, Ill.

W. SIWART SMIT
Twin City Brick Co.,
St. Paul, Minn.

Members

ALABAMA

Alabama Brick & Tile Co.,	Decatur
Alabama Clay Products Co.,	Birmingham
Birmingham Clay Products Co.,	Birmingham
Stephenson Brick Co., Inc.,	Lovick

CALIFORNIA

Cannon & Co.,	Sacramento
Gladding, McBean & Co.,	San Francisco
Livermore Fire Brick Works,	San Francisco
Los Angeles Pressed Brick Co.,	Los Angeles
Pacific Clay Products Co., Inc.,	Los Angeles
Richmond Pressed Brick Co.,	San Francisco

DISTRICT OF COLUMBIA

Hydraulic-Press Brick Co.,	Washington

GEORGIA

Georgia Brick & Tile Co.,	Atlanta
Legg Brick Co.,	Atlanta
Romega Clay Products Co.,	Rome
Standard Brick Co.,	Macon

ILLINOIS

Acme Brick Co.,	Danville
Alton Brick Co.,	Alton
Danville Brick Co.,	Danville
Decatur Brick Mfg. Co.,	Decatur
H. & R. Mining & Mfg. Co.,	East St. Louis
Hydraulic-Press Brick Co.,	Chicago
Hydraulic-Press Brick Co.,	Peoria
Peoria Brick & Tile Co.,	Peoria
Purington Paving Brick Co.,	Streator
Richards Brick Co.,	Edwardsville
Southern Fire Brick & Clay Co.,	Chicago
Streator Brick Co.,	Streator
Western Brick Co.,	Danville

Members—(Continued)

INDIANA

Best Brick Co.,	Evansville
Brazil Clay Co.,	Brazil
Brooklyn Brick Co.,	Indianapolis
Crawfordsville Shale Brick Co.,	Crawfordsville
Huntingburg Pressed Brick Co.,	Huntingburg
Hydraulic-Press Brick Co.,	Indianapolis
Standard Brick Mfg. Co.,	Evansville
United States Brick Co.,	Tell City
Veedersburg Brick Co.,	Veedersburg

IOWA

Adel Clay Products Co.,	Adel
Ballou Brick Co.,	Sioux City
Boone Brick, Tile & Paving Co.,	Des Moines
Des Moines Clay Co.,	Des Moines
Hydraulic-Press Brick Co.,	Davenport
Morey Clay Products Co.,	Ottumwa
Rockford Brick & Tile Co.,	Rockford

KANSAS

Coffeyville Vit. Brick & Tile Co.,	Coffeyville
V. V. V. Brick & Tile Co.,	Neodesha

KENTUCKY

Coral Ridge Clay Products Co.,	Louisville

MARYLAND

Elk River Clay Products Corp.,	Northeast

MINNESOTA

Hydraulic-Press Brick Co.,	Minneapolis
Ochs Brick & Tile Co., A. C.	Springfield
Twin City Brick Co.,	St. Paul

MISSOURI

Hydraulic-Press Brick Co.,	Kansas City
Hydraulic-Press Brick Co.,	St. Louis
Kansas Buff Brick & Mfg. Co.,	Kansas City
Kansas City Brick Co.,	Kansas City

NEW JERSEY

Upper Kittanning Brick Co.,	Jersey City

NEW YORK

Binghamton Brick Co.,	Binghamton
Jewettville Clay Products Co.,	Buffalo

NORTH CAROLINA

Pine Hall Brick Co.,	Winston-Salem
Statesville Brick Co.,	Statesville

OHIO

Acme Brick Co., The,	Marietta
Belden Brick Co., The,	Canton
Canton Brick & Fireproofing Co.,	New Philadelphia
Carlyle-Labold Co., The,	Portsmouth
Claycraft Mining & Brick Co.,	Columbus
Everhard Co., The,	Massillon
Finzer Brothers Clay Co., The,	Sugar Creek
Fultonham Texture Brick Co.,	East Fultonham
Hanover Brick Co.,	Columbus
Hocking Valley Fire Clay Co.,	Nelsonville
Hocking Valley Products Co.,	Logan
Hydraulic-Press Brick Co.,	Cleveland
Hydraulic-Press Brick Co.,	Roseville
Ironclay Brick Co., The,	Columbus
Mapleton Clay Products Co.,	Canton
Marietta Shale Brick Co.,	Marietta
Medal Brick & Tile Co.,	Cleveland
Stark Brick Co.,	Canton
Stone Creek Brick Co.,	Stone Creek
Straitsville Imp. Brick Co.,	New Straitsville
Summitville Face Brick Co.	Summitville
Toronto Fire Clay Co.,	Toronto

OREGON

Standard Brick & Tile Co.,	Portland

PENNSYLVANIA

Alumina Shale Brick Co.,	Bradford
Auburn Shale Brick Co.,	Auburn
Bradford Brick & Tile Co.,	Bradford
Budding Co., J. C.,	Lancaster
Corry Brick & Tile Co.,	Corry
Darlington Brick & Mining Co.,	Darlington
Darlington Clay Products Co.,	Darlington
Fallston Fire Clay Co.	Pittsburgh
Ferro Brick Co.,	Watsontown
Gloninger & Co.,	Pittsburgh
Hazleton Brick Co.,	Hazleton
Hydraulic-Press Brick Co.,	DuBois
Hydraulic-Press Brick Co.,	Philadelphia
Kane Brick & Tile Co.,	St. Marys
Keystone Clay Products Co.,	Greensburg
Kittanning Brick & Fire Clay Co.,	Pittsburgh
Kittanning Clay Mfg. Co.,	Kittanning
Lock Haven Brick & Tile Co.,	Lock Haven
Mill Hall Brick Works,	Lock Haven
Ridgway Brick Co.,	Watsontown
Rochester Clay Products Co.,	Rochester
Royalton Face Brick Co.,	Middletown
Stuempfle's Sons, David,	Williamsport
Walker Brick Co., Hay,	Pittsburgh
Watsontown Brick Co.,	Watsontown
Yingling-Martin Brick Co.,	Pittsburgh

TENNESSEE

Bush & Company, W. G.,	Nashville
Dixie Brick & Tile Co.,	Puryear
Herty Turpentine Cup Co.,	Daisy
Key-James Brick Co.,	Alton Park

UTAH

Ashton Fire Brick & Tile Co.,	Ogden

VIRGINIA

Glasgow Clay Products Co.,	Glasgow

WASHINGTON

Builders Brick Co.,	Seattle
Washington Brick, Lime & Sewer Pipe Co.,	Spokane

UNIVERSITY OF FLORIDA
3 1262 04461798 2

ARCH &
FINE ARTS
LIBRARY

Date Due

Due	Returned	Due	Returned
MAY 24 1996	APR 03 1996		
APR 24 2002	MAY 06 2002		

Architecture & Fine Arts Library
University of Florida
Gainesville, FL 32611